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H. O. No. 99

NOVA SCOTIA PILOT

BAY OF FUNDY
SOUTHEAST COAST OF NOVA SCOTIA
AND COAST OF CAPE BRETON ISLAND

FIFTH EDITION

1918

PUBLISHED BY THE HYDROGRAPHIC OFFICE
UNDER THE AUTHORITY OF THE
SECRETARY OF THE NAVY

WASHINGTON
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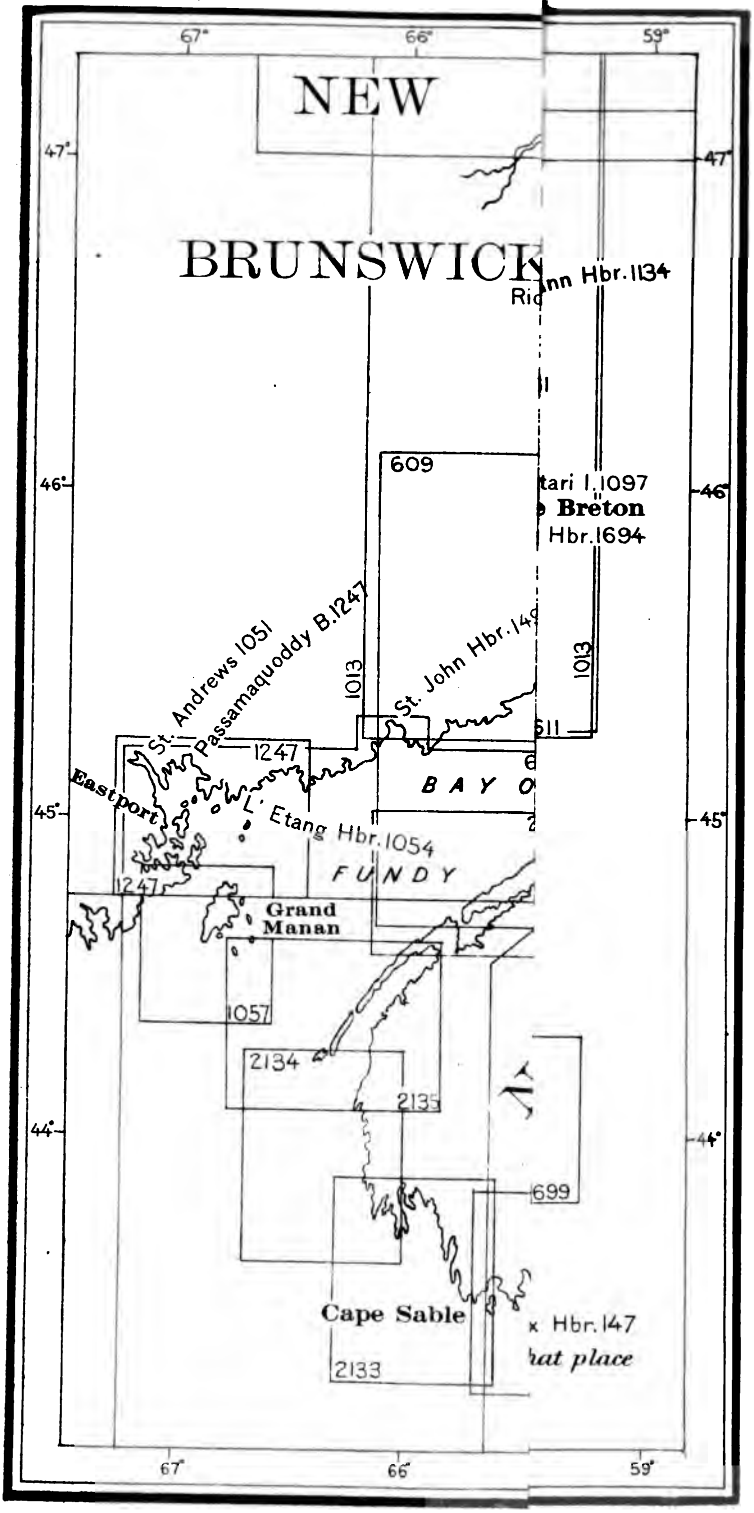
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PREFACE.

This publication, a revision of the fourth edition of H. O. No. 99, treats of the Bay of Fundy, the southeast coast of Nova Scotia, and Nova Scotia Banks and Sable Island; and the coast of Cape Breton Island, including St. Paul Island and George Bay.

The work contains the latest available information from reliable sources, and is corrected to June 10, 1918.

The bearings and courses are true and are given in degrees, from 0° (north) to 360° (clockwise).

Bearings limiting sectors of lights are toward the light.

The direction of winds refer to the points from which they blow; of currents, the points toward which they set. These directions are true.

Variations, with the annual rate of change, may be obtained from H. O. chart No. 2406, Variation of the Compass.

Distances are expressed in nautical miles, the mile being approximately 2,000 yards.

Soundings are referred to low water ordinary springs.

Heights are referred to mean high water.

For details of lights, fog signals, submarine bells, and light buoys mariners should consult H. O. No. 30, List of Lights, Vol. I. Light Lists are published annually, while Sailing Directions can usually only be republished once in a number of years.

Summary of Notices to Mariners.—While it is the intention of the Hydrographic Office to publish about the first of each year a Summary of Notices to Mariners of the preceding year, affecting volumes of Sailing Directions, it must be understood that these summaries are intended to include only important changes and corrections, and that their publication may be discontinued at any time, especially when a new edition of a volume is issued.

No attempt has been made to include in this volume war and mine zone limits, or the special and temporary changes in harbor traffic and pilot regulations, lights, and buoyage, due to the abnormal conditions brought about by the present war.

Masters of vessels should keep complete files of weekly Notices to Mariners and supply themselves with the latest List of Lights, and seek from local authorities, pilots, and harbor masters, the latest information relative to any special regulations in force in the particular locality visited, and must be governed by any orders given them by national patrol boats, no matter what harbor of any of the warring nations they may be approaching or entering.

Mariners are requested to notify the U. S. Hydrographic Office, Washington, D. C., or one of its branch offices, of errors they may discover in this publication, or of additional matter which they think should be inserted.

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INFORMATION RELATING TO NAVIGATIONAL AIDS AND GENERAL NAVIGATION.

THE CORRECTION OF CHARTS, LIGHT LISTS, AND SAILING DIRECTIONS.

The following publications are issued by the United States Hydrographic Office as guides to navigation: Charts, Chart Catalogues, Sailing Directions, Light Lists, Tide Tables, Notices to Mariners, Pilot Charts, and Hydrographic Bulletins. Of these, the Notices to Mariners and the Hydrographic Bulletins are free to mariners and others interested in shipping. The Pilot Charts are free to contributors of professional information, but are sold to the general public at 10 cents a copy. The other publications of the office are sold under the law at cost price.

The Charts, the Sailing Directions, and the Light Lists are all affected by continual changes and alterations, concerning which information from all parts of the world is published weekly in the Notices to Mariners.

The charts are always corrected for all available information up to the date of issue stamped upon them; and the Light Lists should be noted for the recent alterations and additions. The Sailing Directions, however, can not, from their nature, be so fully corrected, and in all cases where they differ from the charts, the charts must be taken as the guide.

Charts.—When issued from the Hydrographic Office, the charts have received all necessary corrections to date.

All small but important corrections that can be made by hand are given in the Notices to Mariners, and should at once be placed on the charts to which they refer.

Extensive corrections that can not be conveniently thus made are put upon the plates, and new copies are put on sale. Masters of vessels are urged to replace the old charts, which should be destroyed to prevent the possibility of their being used in the navigation of the ship.

The dates on which extensive corrections are made are noted on the chart on the right of the middle of the lower edge; those of the smaller corrections at the left lower corners.

The edition, and corresponding date, of the chart will be found in the right lower corner, outside the outer neat line.

In all cases of quotations of charts, these dates of corrections should be given, as well as the number of the chart (found in the lower right and upper left corners), in order that the edition of the chart referred to may be known.

The Light Lists are corrected before issue, and all changes are published in the weekly Notices to Mariners.

The navigating officer should make notations in the tabular form in the Light Lists and paste in at the appropriate places slips from the Notices to Mariners.

The Light Lists should always be consulted as to the details of a light, as the description in the sailing directions is not complete, and may be obsolete, in consequence of changes since publication.

The Sailing Directions or Pilots are kept corrected by addenda; and subsequent to date of last addenda, they should be kept corrected by means of the Notices to Mariners. Sailing Directions issued to naval vessels carry with them an envelope containing slips of corrections up to date of issue.

Addenda are published from time to time, and contain a summary of all the information received up to date since the publication of the volume to which they refer, canceling all previous Notices to Mariners.

To enable the books to be more conveniently corrected, addenda and Notices to Mariners are printed on one side only, and two copies of the latter are issued to each naval vessel, one to be cut and the slips pasted in at the appropriate places, the other to be retained intact for reference.

To paste in the slips, as the Notices to Mariners are received, is one of the duties of the navigating officer, demanding faithful attention.

It must, however, be understood that Sailing Directions will rarely be correct in all details, and that, as already stated, when differences exist, the chart, which should be corrected from the most recent information, should be taken as the guide, for which purpose, for ordinary navigation, it is sufficient.

The Tide Tables, which are published annually by the United States Coast and Geodetic Survey, give the predicted times and heights of the high and the low waters for every day in the year at 70 of the principal ports of the world, and, through the medium of these by means of tidal differences and ratios, at a very large number of subordinate ports. The tables for the Atlantic and the Pacific coast ports of the United States are also published separately.

It should be remembered that these tables aim to give the times of high and low water, and not the times of turning of the current or of slack water, which may be quite different.

Notices to Mariners, containing newly acquired information pertaining to various parts of the world, are published weekly and mailed to all United States ships in commission, Branch Hydrographic offices and agencies, and United States consulates. Copies are furnished free by the main office or by any of the branch offices on application.

With each Notice to naval vessels is sent also a separate sheet, giving the items relating to lights contained in the latest Notice, intended especially for use in correcting the Light Lists.

Pilot Charts of the North Atlantic, Central American Waters, and North Pacific and Indian Oceans are published each month, and of the South Atlantic and South Pacific Oceans each quarter. These charts give the average conditions of wind and weather, barometer, percentage of fog and gales, routes for steam and sailing vessels for the period of issue, ice, and derelicts for the preceding period, ocean currents and magnetic variation for the current year, storm tracks for preceding years, and much other useful information. They are furnished free only in exchange for marine data or observations.

Hydrographic Bulletins, published weekly, are supplemental to the Pilot Charts, and contain the latest reports of obstructions and dangers along the coast and principal ocean routes, ice, derelicts, and wreckage, reports of the use of oil to calm the sea, and other information for mariners. They are to be had free upon application.

THE USE OF CHARTS.

Accuracy of chart.—The value of a chart must manifestly depend upon the character and accuracy of the survey on which it is based, and the larger the scale of the chart the more important do these become.

To judge of a survey, its source and date, which are generally given in the title, are a good guide. Besides the changes that may have taken place since the date of the survey, in waters where sand or mud prevails, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail; until a chart founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbors and their approaches, no surveys yet made have been so thorough as to make it certain that all dangers have been found. The number of the soundings is another method of estimating the completeness of the survey, remembering, however, that the chart is not expected to show all the soundings that were obtained. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

Large or irregular blank spaces among soundings mean that no soundings were obtained in these spots. When the surrounding soundings are deep it may fairly be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch or pinnacle rock.

A wide berth should therefore be given to every rocky shore or patch, and instead of considering a coast to be clear, the contrary should be assumed.

Fathom curves a caution.—Except in charts of harbors that have been surveyed in detail, the 5-fathom curve on most charts may be considered as a danger line or caution against unnecessarily approaching the shore or bank within that line, on account of the possible existence of undiscovered inequalities of the bottom, which only an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for so detailed a survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The 10-fathom curve on rocky shores is another warning, especially for ships of heavy draft.

A useful danger curve will be obtained by tracing out with a colored pencil, or ink, the line of depth next greater than the draft of the ship using the chart. For vessels drawing less than 18 feet the edge of the sanding serves as a well-marked danger line.

Charts on which no fathom curves are marked must especially be regarded with caution, as indicating that soundings were too scanty and the bottom too uneven to enable the curves to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed around, as it is doubtful how closely the spot may have been examined and whether the least depth has been found.

The chart on largest scale should always be used on account of its greater detail and the greater accuracy with which positions may be plotted on it.

Caution in using small-scale charts.—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on one of small scale the same amount of displacement means a large fraction of a mile.

Distortion of printed charts.—The paper on which charts are printed from engraved plates has to be damped. On drying distortion takes place from the inequalities of the paper, which greatly varies with different papers and the amount of the damping; but it does not affect navigation. The larger the chart the greater the amount of this distortion. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted on the chart, especially if the lines to objects be long.

Mercator chart.—Observed bearings are not identical with those measured on the Mercator chart (excepting only the bearings north and south, and east and west on the Equator) because the line of sight, except as affected by refraction, is a straight line and lies in the plane of the great circle, while the straight line on the chart (except the meridian line) represents, not the arc of a great circle, but the loxodromic curve, or rhumb line, which on the globe is a spiral approaching but never in theory reaching the pole, or, if the direction be east and west, a circle of latitude.

The difference is not appreciable with near objects, and in ordinary navigation may be neglected. But in high latitudes, when the objects are very distant and especially when lying near east or west, the bearings must be corrected for the convergence of the meridians in order to be accurately placed on the Mercator chart, which represents the meridians as parallel.

On the polyconic chart, since a straight line represents (within the limits of 15 or 20 degrees of longitude) the arc of a great circle or the shortest distance between two points, bearings of the chart are identical with observed bearings.

The Mercator projection is unsuited to surveying, for which purpose the polyconic projection is used by the Hydrographic Office and the Coast and Geodetic Survey.

Notes on charts should always be read with care, as they may give important information that can not be graphically represented.

Buoys.—Too much reliance should not be placed on buoys always maintaining their exact positions. They should therefore be regarded as warnings, and not as infallible navigational marks, especially when in exposed places and in the winter time, and a ship's position should always, when possible, be checked by bearings or angles of fixed objects on shore.

Gas buoys.—The lights shown by gas buoys can not be implicitly relied on; the light may be altogether extinguished, or, if periodic, the apparatus may get out of order.

Whistle and bell buoys are sounded only by the action of the sea; therefore, in calm weather, they are less effective or may not sound.

Lights.—All the distances given in the Light Lists and on the charts for the visibility of lights are calculated for a height of 15 feet for the observer's eye. The effect of a greater or less height of eye can be ascertained by means of the table of distances of visibility due to height, published in the Light Lists.

The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Refraction, too, may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light, the fact may be forgotten that aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be obtained from the standard compass when you lay down from aloft.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the ship is on the circle of visibility corresponding with the usual height of the eye, or unexpectedly nearer the light.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by its candlepower or order, as stated in the Light Lists, and in some cases by noting how much its visibility in clear weather falls short of the range corresponding to its height. Thus, a light standing 200 feet above the sea and recorded as visible only 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of sufficient power.

Fog signals.—Sound is conveyed in a very capricious way through the atmosphere. Apart from the influence of the wind large areas of silence have been found in different directions and at different distances from the origin of sound, even in clear weather; therefore, too much confidence should not be felt as to hearing a fog signal. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly toward the land, and may not be observed by the lighthouse keepers until upon them; a ship may have been for many hours in it, and approaching the land in confidence, depending on the signal, which is not sounded. When sound travels against the wind, it may be thrown upward; a man aloft might then hear it though inaudible on deck.

The submarine bell system of fog signals is much more reliable than systems transmitting sound through the air, as sound traveling in water is not subject to the same disturbing influences; the fallibility of the lighthouse keeper is, however, about the same in all systems, so that caution should be observed even by vessels equipped with submarine-bell receiving apparatus.

Submarine bells have an effective range of audibility greater than signals sounded in air, and a vessel equipped with receiving apparatus may determine the approximate bearing of the signal. These signals may be heard also on vessels not equipped with receiving apparatus by observers below the water line, but the bearing of the signal can not then be readily determined.

Vessels equipped with radio apparatus and submarine bell receivers may fix their distance from a light vessel having radio and submarine bell, utilizing the difference in velocity of sound waves of the radio and the bell. Sound travels 4,794 feet per second at 66° F. in water, and the travel of radio sound waves for practicable distances may be taken as instantaneous.

All vessels should observe the utmost caution in closing the land in fogs. The lead is the safest guide and should be faithfully used.

Tides.—A knowledge of the times of high and low water and of the amount of vertical rise and fall of the tide is of great importance in the case of vessels entering or leaving port, especially when the low water is less than or near their draft. Such knowledge is also useful at times to vessels running close along a coast, in enabling them to anticipate the effect of the tidal currents in setting them on or offshore. This is especially important in fog or thick weather.

The predicted times and heights of the high and low waters, or differences by which they may be readily obtained, are given in the Tide Tables for all the important ports of the world. The height at any intermediate time may be obtained by means of Table 3 for most of the principal tidal stations of the United States, given in Table 1, and for the subordinate stations of Table 2 by using them as directed in the Tide Tables. The intermediate height may also be obtained by plotting the predicted times and heights of high and low water and connecting the points by a curve. Such knowledge is often useful in crossing a bar or shallow flats.

Planes of reference.[1]—The plane of reference for soundings on Hydrographic Office charts made from United States Government surveys and on Coast and Geodetic Survey charts of the Atlantic coast of the United States is mean low water; on the Pacific coast of the United States as far as the Strait of Juan Fuca, it is the mean of the lower low waters; and from Puget Sound to Alaska, the plane employed on Hydrographic Office charts is low water ordinary springs.

On most of the British Admiralty charts the plane of reference is the low water of ordinary springs; on French charts, the low water of equinoctial springs.

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[1] The distinction between "rise" and "range" of the tide should be understood. The former expression refers to the height attained above the datum plane or soundings, differing with the different planes of reference; the latter, to the difference of level between successive high and low waters.

In the case of many charts compiled from old or various sources the plane of reference may be in doubt. In such cases, or whenever not stated on the chart, the assumption that the reference plane is low water ordinary springs gives a larger margin of safety than mean low water.

Whichever plane of reference may be used for a chart it must be remembered that there are times when the tide falls below it. Low water is lower than mean low water about half the time, and when a new or full moon occurs at perigee the low water is lower than the average low water of springs. At the equinoxes the spring range is also increased on the coasts of Europe, but in some other parts of the world, and especially in the Tropics, such periodic low tides may coincide more frequently with the solstices.

Wind or a high barometer may at times cause the water to fall below even a very low plane of reference.

On coasts where there is much diurnal inequality in the tides, the amount of rise and fall can not be depended upon and additional caution is necessary.

Mean sea level.—The important fact should be remembered that the depths at half tide are practically the same for all tides, whether neaps or springs. Half tide therefore corresponds with mean sea level. This makes a very exact plane of reference, easily found, to which it would be well to refer all high and low waters.

The Tide Tables give in Table 1, for all the ports, the plane of reference to which tidal heights are referred and its distance below mean sea level. See also explanation of Table 2.

If called on to take special soundings for the chart at a place where there is no tidal bench mark, mean sea level should be found and the plane for reductions established at the proper distance below it, as ascertained by the Tide Tables, or by observations, or in some cases, if the time be short, by estimation, the data used being made a part of the record.

Tidal streams.—In navigating coasts where the tidal range is considerable, especial caution is necessary. It should be remembered that there are indrafts to all bays and bights, although the general run of the stream may be parallel with the shore.

The turn of the tidal stream offshore is seldom coincident with the times of high and low water on the shore. In some channels the tidal stream may overrun the turn of the vertical movement of the tide by three hours, forming what is usually known as tide and half tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

The effect of the tidal wave in causing currents may be illustrated by two simple cases.

(1) Where there is a small tidal basin connected with the sea by a large opening.

(2) Where there is a large tidal basin connected with the sea by a small opening.

In the first case the velocity of the current in the opening will have its maximum value when the height of the tide within is changing most rapidly, i. e., at a time about midway between high and low water. The water in the basin keeps at approximately the same level as the water outside. The flood stream corresponds with the rising and the ebb with the falling of the tide.

In the second case the velocity of the current in the opening will have its maximum value when it is high water or low water without, for then there is the greatest head of water for producing motion. The flood stream begins about three hours after low water, and the ebb stream about three hours after high water, slack water thus occurring about midway between the tides.

Along most shores not much affected by bays, tidal rivers, etc., the current usually turns soon after high water and low water.

The swiftest current in straight portions of tidal rivers is usually in the middle of the stream, but in curved portions the most rapid current is toward the outer edge of the curve, and here the water will be deepest. The pilot rule for best water is to follow the ebb tide reaches.

Countercurrents and eddies may occur near the shores of straits, especially in bights and near points. A knowledge of them is useful in order that they may be taken advantage of or avoided.

A swift current often occurs in a narrow passage connecting two large bodies of water, owing to their considerable difference of level at the same instant. The several passages between Vineyard Sound and Buzzards Bay are cases in point. In the Woods Hole passage the maximum strength of the tidal streams is at about high and low water.

Tide rips are made by a rapid current setting over an irregular bottom, as at the edges of banks where the change of depth is considerable.

Current arrows on charts show only the most usual or the mean direction of a tidal stream or current; it must not be assumed that the direction of a stream will not vary from that indicated by the arrow. The rate, also, of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

FIXING POSITION.

Sextant method.—The most accurate method available to the navigator of fixing a position relative to the shore is by plotting with a protractor, sextant angles between three well-defined objects on shore which are shown on the chart; this method, based on the "three-point problem" of geometry, should be in general use.

For its successful employment it is necessary: First, that the objects be well chosen; and, second, that the observer be skillful and rapid in his use of the sextant. The latter is only a matter of practice. Two observers are better for this method.

Near objects should be used either for bearings or angles for position in preference to distant ones, although the latter may be more prominent, as a small error in the bearing or angle or in laying it on the chart has a greater effect in misplacing the position the longer the line to be drawn.

On the other hand distant objects should be used for direction, because less affected by a small error or change of position.

The three-arm protractor or station pointer consists of a graduated brass circle with one fixed and two movable radial arms, the three beveled edges of the arms, if produced, intersecting at the exact center of the instrument. The edge of the fixed arm marks the zero of the graduation which enables the movable arms to be set at any angles with the fixed arm.

To plot a position, the two angles observed between the three selected objects are set on the instrument, which is then moved over the chart until the three beveled edges pass respectively and simultaneously through the three objects. The center of the instrument will then mark the ship's position, which may be pricked on the chart or marked with a pencil point through the center hole.

The transparent xylonite protractor is an excellent substitute for the brass instrument and in some cases preferable to it, as when, for instance, the objects angled on are so near the observer that they are more or less hidden by the circle of the instrument. The xylonite protractor also permits the laying down for simultaneous trial of a number of angles in cases of fixing important positions. Plain tracing paper may also be used if there are any suitable means of laying off the angles.

The value of a determination depends greatly on the relative positions of the objects observed. If the position sought lies on the circle passing through three objects (in which case the sum of the observed angles equals the supplement of the angle at the middle object made by lines from the other two) it will be indeterminate, as it will plot all around the circle. Such an observation is called a "revolver." An approach to this condition must be avoided. Near objects are better than distant ones, and, in general, up to 90° the larger the angles the better, remembering always that large as well as small angles may plot on or near the circle and hence be worthless. If the objects are well situated, even very small angles will give for navigating purposes a fair position, when that obtained by bearings of the same objects would be of little value.

Accuracy requires that the two angles be simultaneous. If under way and there is but one observer the angle that changes less rapidly may be observed both before and after the other angle and the proper value obtained by interpolation.

A single angle and a range of two objects give in general an excellent fix, easily obtained and plotted.

Advantages of sextant method.—In many narrow waters where the objects may yet be at some distance, as in coral harbors or narrow passages among mud banks, navigation by sextant and protractor is invaluable, as a true position can in general be obtained only by its means. Positions by bearings are too rough to depend upon, and a small error in either taking or plotting a bearing might under such circumstances put the ship ashore.

In all cases where great accuracy of position is desired, such as the fixing of a rock or shoal, or of fresh soundings or new buildings as additions to the chart, the sextant should invariably be used. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. If a round of angles can be taken the observer's accuracy is also checked. In the case of ordinary soundings a third angle need be taken only occasionally; first, to check the general accuracy of the chart, as above stated; second, to make certain that the more important soundings, as at the end of a line, are correctly placed.

If communication can be had with the shore, positions may be fixed with great accuracy by occupying with theodolite or sextant two known points of the chart. The third angle of the triangle, that between the two points at the position sought, should be measured as a check.

The compass.—It is not intended that the use of the compass to fix the ship should be given up; in ordinary piloting the compass, with its companion, the pelorus, may be usefully employed for this purpose, although less accurate than the sextant.

If the accuracy of the chart is doubtful, the compass should be used in preference to the sextant.

In fixing by the compass, it should always be remembered that a position by two bearings only, like that by two angles only, is liable to error. An error may be made in taking a bearing, or in applying to it the deviation, or in laying it on the chart. A third or check bearing should, therefore, be taken of some other object, especially when near the shore or dangers. A common intersection for the three lines assures accuracy.

When the three lines do not intersect in a point, the following rule holds: If the line drawn to the middle object falls to the right of the point of intersection of the lines to the two outside objects, the position of the observer was to the right of the line to the middle object; and if it falls to the left of the intersection his position was to the left of the line. Thus it will be seen that the assumption, that the position is at the center of the triangle formed by the intersecting lines, is incorrect.

Doubling the angle on the bow.—The method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "bow and beam bearing," the distance from the object at the latter position being the distance run between the times of taking the two bearings, gives the maximum of accuracy, and is an excellent fix for a departure, but does not insure safety, as the object observed and any dangers off it are abeam before the position is obtained.

By taking the bearings at two points and four points on the bow, a fair position is obtained before the object is passed, the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current. Taking afterwards the beam bearing gives, with slight additional trouble, the distance of the object when abeam; such beam bearings and distances, with the times, should be continuously recorded as fresh departures, the importance of which will be appreciated in cases of being suddenly shut in by fog.

When the first bearing is 26½° from ahead, and the second 45°, the run between bearings will equal the distance at which the object will be passed abeam.

A table of multipliers of the distance run in the interval between any two bearings of an object, the product being its distance at the time of the second bearing, is given in the Light Lists and in Bowditch.

Danger angle.—The utility of the danger angle in passing outlying rocks or dangers should not be forgotten. In employing the horizontal danger angle, however, caution is necessary, as should the chart be inaccurate, i. e., should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not, therefore, be employed when the survey is old or manifestly imperfect.

The vertical danger angle may be conveniently used when passing elevated points of known heights, such as lighthouses, cliffs, etc. The computation of the distance corresponding to the height of the object and its angular elevation requires for small distances merely the solution of a plain right triangle; the natural cotangent of the angle multiplied by the height in feet gives the distance in feet. The convenient use of this method, however, requires tables such as those published by Capt. Lecky in his little book entitled "The Danger Angle and Offshore Distance Tables." This book very usefully extends the vertical angle method to finding a ship's position at sea by observing the angular altitude of a peak of known height and its bearing. The tables give heights up to 18,000 feet and distances up to 110 miles.

When the angles are not too large they should be observed "on and off the limb" and the index error of the sextant thus eliminated, in preference to correcting for it the single altitude. It must be remembered that in high latitudes the bearing of a distant object needs correction for the convergence of the meridians before being laid down on a Mercator chart. The correction may be found by the following formula, using the approximate position: The sine of the correction equals the product of the sine of half the difference of longitude by the sine of the middle latitude. It is applied on the equatorial side of the observed bearing and its effect is always to increase the latitude of the observer.

Soundings taken at random are of little value in fixing or checking position and may at times be misleading. In thick weather, when near or closing the land, soundings should be taken continuously and at regular intervals, and, with the character of the bottom, systematically recorded. By laying the soundings on tracing paper, according to the scale of the chart, along a line representing the track of the ship, and then moving the paper over the chart, keeping the line representing the track parallel with the course until the observed soundings agree with those of the chart, the ship's position will in general be quite well determined. This plan was suggested by Lord Kelvin, whose admirable sounding machine renders the operation of sounding possible in quite deep water, without slowing down the ship and consequent loss of time.

Pelorus.—All ships should be supplied with the means of taking accurate bearings both by night and by day. The standard compass is not always conveniently placed for the purpose; in such case a pelorus will be very useful, but the results are not as accurate as those obtained direct from the compass. The utility of such an instrument in ascertaining the change of bearing of an approaching ship should not be overlooked.

Position lines.—Among the various methods of fixing position at sea, the one which should be best understood and put to the most constant use is that employing position or Sumner lines. These lines give the most comprehensive information to the navigator with the least expenditure of labor and time. The knowledge gained is that the vessel must be somewhere on the line, provided the data used is accurate and the chronometer correct. As the information given by one line of position is not sufficient to determine the definite location of the vessel, it is necessary to cross this line by another similarly obtained, and the vessel being somewhere on both must be at their intersection. However, a single line, at times, will furnish the mariner with invaluable information; for instance, if it is directed toward the coast, it marks the bearing of a definite point on the shore, or if parallel to the coast, it clearly indicates the distance off, and so will often be found useful as a course. A sounding taken at the same time with the observation will in certain conditions prove of great value in giving an approximate position on the line.

The easiest and quickest way to establish a line of position is by employing the method of Marcq St. Hilaire, as modified by the use of tables of altitude. The principle of this method is one of altitude differences, in which the observed altitude is compared with the computed altitude for a dead reckoning, or other selected position, and the difference in minutes of latitude measured toward the body along the line of its azimuth, if the observed altitude is greater than the computed altitude, and vice versa. A line drawn at right angles to the line of azimuth through the point thus determined is the position line, somewhere upon which will be found the position of the vessel. The tables of altitude obviate the computation of the altitude and thereby greatly facilitate the establishment of the line.

A position line may also be found by computing two positions for longitude with two assumed latitudes, and drawing the line between them; or by drawing to the position obtained with one latitude a line at right angles to the bearing of the body as taken from the azimuth tables.

A very accurate position can be obtained by observing two or more stars at morning or evening twilight, at which time the horizon is well defined. The position lines thus obtained will, if the bearings of the stars differ three points or more, give an excellent result. A star or planet at twilight and the sun afterwards or before may be combined; also two observations of the sun with sufficient interval to admit of a considerable change of bearing. In these cases one of the lines must be moved for the run of the ship. The moon is often visible during the day and in combination with the sun gives an excellent fix.

The morning and evening twilight observations, besides their great accuracy, possess the additional advantage of greatly extending the ship's reliable reckoning beyond the limits of the ordinary day navigation, and correspondingly restricting the dead reckoning uncertainties of the night. An early morning fix in particular is often of great value. Though the same degree of accuracy as at twilight can not be expected, night observations are very valuable and should be assiduously practiced.

Piloting.—The navigator, in making his plan for entering a strange port, should give very careful previous study to the chart and sailing directions, and should select what appear to be the most suitable marks for use, also providing himself with substitutes to use in case those selected as most suitable should prove unreliable in not being recognized with absolute certainty. Channel buoys seen from a distance are difficult to identify, because their color is sometimes not easily distinguished and they may appear equally distant from the observer even though they be at widely varying distances. Ranges should be noted, if possible, and the lines drawn, both for leading through the best water in channels, and also for guarding against particular dangers; for the latter purpose safety bearings should in all cases be laid down where no suitable ranges appear to offer. The courses to be steered in entering should also be laid down and distances marked thereon. If intending to use the sextant and danger angle in passing dangers, and especially in passing between dangers, the danger circles should be plotted and regular courses planned, rather than to run haphazard by the indications of the angle alone, with the possible trouble from bad steering at critical points.

The ship's position should not be allowed to be in doubt at any time, even in entering ports considered safe and easy of access, and should be constantly checked, continuing to use for this purpose those marks concerning which there can be no doubt until others are unmistakably identified.

The ship should ordinarily steer exact courses and follow an exact line, as planned from the chart, changing course at precise points, and, where the distances are considerable, her position on the line should be checked at frequent intervals. This is desirable even where it may seem unnecessary for safety, because if running by the eye alone and the ship's exact position be immediately required, as in a sudden fog or squall, fixing at that particular moment may be attended with difficulty.

The habit of running exact courses with precise changes of course will be found most useful when it is desired to enter port or pass through inclosed waters during fog by means of the buoys; here safety demands that the buoys be made successively, to do which requires, if the fog be dense, very accurate courses and careful attention to the times, the speed of the ship, and the set of the current; failure to make a buoy as expected leaves, as a rule, no safe alternative but to anchor at once, with perhaps a consequent serious loss of time.

In passing between dangers where there are no suitable leading marks, as, for instance, between two islands or an island and the main shore, with dangers extending from both, a mid-channel course may be steered by the eye alone with great accuracy, as the eye is able to estimate very closely the direction midway between visible objects.

In piloting among coral reefs or banks, a time should be chosen when the sun will be astern, conning the vessel from aloft or from an elevated position forward. The line of demarcation between the deep water and the edges of the shoals, which generally show as green patches, is indicated with surprising clearness. This method is of frequent application in the numerous passages of the Florida Keys.

Changes of course should in general be made by exact amounts, naming the new course or the amount of the change desired, rather than by ordering the helm to be put over and then steadying when on the desired heading, with the possibility of the attention being diverted and so of forgetting in the meantime, as may happen, that the ship is still swinging. The helmsman, knowing just what is desired and the amount of the change to be made, is thus enabled to act more intelligently and to avoid bad steering, which in narrow channels is a very positive source of danger.

Coast piloting involves the same principles and requires that the ship's position be continuously determined or checked as the landmarks are passed. On well surveyed coasts there is a great advantage in keeping near the land, thus holding on to the marks and the soundings, and thereby knowing at all times the position, rather than keeping offshore and losing the marks, with the necessity of again making the land from vague positions, and perhaps the added inconvenience of fog or bad weather, involving a serious loss of time and fuel.

The route should be planned for normal conditions of weather, with suitable variations where necessary in case of fog or bad weather or making points at night, the courses and distances, in case of regular runs over the same route, being entered in a notebook for ready reference, as well as laid down on the chart. The danger circles for either the horizontal or the vertical danger angles should be plotted, wherever the method can be usefully employed, and the angles marked thereon; many a mile may thus be saved in rounding dangerous points with no sacrifice in safety. Ranges should also be marked in, where useful for position or for safety, and also to use in checking the deviation of the compass by comparing, in crossing, the compass bearing of the range with its magnetic bearing, as given by the chart.

Changes of course will in general be made with mark or object abeam, the position (a new "departure") being then, as a rule, best and most easily obtained. The pelorus should be at all times in readiness for use, and the chart where it may be readily consulted by the officer of the watch. The sextant should also be kept conveniently at hand.

A continuous record of the progress of the ship should be kept by the officer of the watch, the time and patent-log reading of all changes of course and of all bearings, especially the two and four point bearings, with distance of object when abeam, being noted in a book kept in the pilot house for this especial purpose. The ship's reckoning is thus continuously cared for as a matter of routine and without the presence or particular order of the captain or navigating officer. The value of thus keeping the reckoning always fresh and exact will be especially appreciated in cases of sudden fog or when making points at night.

Where the coastwise trip must be made against a strong head wind, it is desirable, with trustworthy charts, to skirt the shore as closely as possible in order to avoid the heavier seas and adverse current that prevail farther out. In some cases, with small ships, a passage can be made only in this way. The important saving of coal and of time, which is even more precious, thus effected by skillful coast piloting makes this subject one of prime importance to the navigator.

Change in the variation of the compass.[1]—The gradual change in the variation must not be forgotten in laying down on the chart courses and bearings. The magnetic compasses placed on the charts for the purpose of facilitating the plotting become in time slightly in error, and in some cases, such as with small scales or when the lines are long, the displacement of position from neglect of this change may be of importance. The date of the variation and the annual change, as given on the compass rose, facilitate corrections when the change has been considerable. The compasses are reengraved once in ten years; more frequent alterations on one spot in a copperplate would not be practicable.

The change in the variation is in some parts of the world so rapid as to need careful consideration, requiring a frequent change of the course. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles.

Local magnetic disturbance of the compass on board ship.—The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship. Observation shows that disturbance of the compass in a ship afloat is experienced in only a few places on the globe.

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[1] See H. O. Chart No. 2406, Variation of the compass.

Magnetic laws do not permit of the supposition that the visible land causes such disturbance, because the effect of a magnetic force diminishes so rapidly with distance that it would require a local center of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow and the force strong, the compass may be temporarily deflected when passing over such a spot; but the area of disturbance will be small unless there are many centers near together.

Use of oil for modifying the effect of breaking waves.— Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skillfully applied, may prevent much damage both to ships, especially of the smaller classes, and to boats by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:

1. On free waves, i. e., waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when no other oil is obtainable, or it may be mixed with other oils; all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. In cold water, the oil, being thickened by the low temperature and not being able to spread freely, will have its effect much reduced, a rapid-spreading oil should be used.

5. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

6. It is useful in a ship or boat either when running, or lying-to, or in wearing.

7. When lowering and hoisting boats in a heavy sea the use of oil has been found greatly to facilitate the operation.

8. For a ship at sea the best method of application appears to be to hang over the side, in such a manner as to be in the water, small canvas bags, capable of holding from 1 to 2 gallons of oil, the bags being pricked with a sail needle to permit leakage. The waste pipes forward are also very useful for this purpose.

9. Crossing a bar with a flood tide, to pour oil overboard and allow it to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan.

On a bar, with the ebb tide running, it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside, bearing in mind that her natural tendency is always to forge ahead. If she is aground the effect of oil will depend upon attending circumstances.

11. For a boat riding in bad weather to a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil can be diffused well ahead of the boat, and the bag readily hauled on board for refilling, if necessary.

CHAPTER I.

GENERAL REMARKS—NOVA SCOTIA BANKS—SABLE ISLAND — GENERAL DIRECTIONS — PASSAGES — BUOYAGE — COAL — DOCKS — PILOTS — CLIMATE — WINDS AND WEATHER—GALES—STORM SIGNALS—FOGS—ICE—CURRENTS.

New Brunswick, which forms the northern shore of the Bay of Fundy, limits the Gulf of St. Lawrence on the west and the St. Lawrence River on the south, and has a coast line of about 500 miles, which is only interrupted by the low isthmus which joins it with Nova Scotia. Its area is about 28,000 square miles.

The general surface of this Province is broken by a series of bold undulations, which do not, however, rise into mountains, and is traversed by many rivers, the principal of which is that of St. John, which flows into the well-known harbor of the same name, and which is navigable for vessels of moderate tonnage to Fredericton, 88 miles from its mouth, and for steamers of light draft 65 miles above Fredericton.

Coal is found in great abundance, and iron ore and gypsum, as well as other minerals, are also to be found in considerable quantities. A great portion of the country is covered by dense forests, and the cutting and exporting of timber affords remunerative employment to a large number of the inhabitants. Shipbuilding is carried on to a considerable extent throughout the Province, but chiefly at St. John.

The exports of New Brunswick are fish, timber, lumber, iron, coal, gypsum, manganese, and hay. The imports are wheat and grain, flour, salt meats, coffee, tea, sugar, molasses, and fruits; also woolen, cotton, and silk goods.

Nova Scotia, originally Acadia, a Province of the Dominion, consists of a peninsula, together with Cape Breton Island, which is separated from the mainland by the Gut of Canso. Its extreme length is 350 miles and breadth about 120 miles, with an entire area of 20,907 square miles, about one-fifth part of which consists of lakes, rivers, and inlets of the sea.

Nova Scotia is connected with New Brunswick by an isthmus only 10 miles in width. It is bounded on the north by Northumberland Strait (which separates it from Prince Edward Island) and the Gulf of St. Lawrence; northeast, southeast, and south by the Atlantic Ocean; west by the Bay of Funday; and northwest by New Brunswick.

Physical features and geology—Nova Scotia.—From Cape Canso a range of high lands runs in a sweep through Nova Scotia to Cape Sable. Cobequid Range, running parallel with the preceding range, along the northern part of the Province from Cape Porcupine, in the Gut of Canso, to Cape Chignecto, in the Bay of Fundy, reaches heights of 1,100 feet and are capable of cultivation to their summits. The summits are of crystalline, granitoid, and syenitic masses, and are covered with valuable timber, while in the intervening depressions agricultural products grow luxuriantly. Between these parallel ranges is a wide and fertile valley. Along the Bay of Fundy, from Digby Neck to Capes Split and Blomidon, a sharply outlined ridge of precipices runs for 130 miles.

The rocky southeastern coast extends about 235 miles nearly east-northeast and west-southwest from Cape Canso to Cape Sable, with numerous indentations throughout its whole extent. Numerous islands and sunken dangers fringe the coast, making local knowledge indispensable in coastwise navigation, especially on account of the prevalence during the greater part of the year of fogs of a density seldom experienced elsewhere.

The soils of Nova Scotia are various along the southern shore; granite forms the basis, extending in many places 20 miles into the interior. This region is the least fertile, and being that which strangers first see is apt to create an unfavorable impression; but there are elsewhere extensive alluvial tracts, producing the most abundant crops. The forests also abound in good timber, ash, beech, birch, maple, oak, pine, and spruce being the most common trees indigenous to the country.

Products and trade.—Agriculture and horticulture are among the principal industries in the Province. Rye, oats, barley, Indian corn, potatoes, tomatoes, and all root crops grow in abundance, but wheat is not cultivated to any great extent. Apples and other fruits attain great perfection. Cottons and woolens are manufactured, and there are steel works at New Glasgow. There are also paper mills, sugar refineries, boot factories, agricultural and other machinery factories, and many sawmills. Mining is extensively carried on. The principal coal mines are at Pictou and Springhill. Other minerals are abundant, including tin, silver, manganese, gypsum, slates, etc.

The fisheries of Nova Scotia are very important, the waters abounding with mackerel, cod, herring, shad, salmon, halibut, haddock, lobsters, etc.

The chief exports are fish products, minerals, lumber, agricultural products, and general manufactures.

Climate.—Subject to extremes of heat and cold, with rapid changes of temperature, Nova Scotia and New Brunswick closely resemble each other in climate, the range of temperature being from 98° F. in summer to 20° below zero in winter, with changes of as much as 50° or more in a day.

Normal conditions of temperature are somewhat altered on and near the seacoast; fogs, which are of frequent occurrence, lower the high temperature in summer, and the severity of winter is mitigated by southerly winds, in conjunction with the proximity of the Gulf Stream, but this alleviation of temperature does not extend for any distance inland, as instanced by the fact that the summer heat at Fredericton, the capital of New Brunswick, is sometimes 8° to 10° higher, and the winter cold 18° to 20° lower than at St. John, the seaport, which is distant from it only 88 miles by the river.

The city of Halifax, capital of Nova Scotia, occupies a central position on the Atlantic seaboard of the Province, and though somewhat more than 5° south of the southern point of Great Britain, its climatic fluctuations are greater and more severe than anything experienced in the British Isles; for like other portions of the North American Continent, sudden changes of temperature sometimes occur, amounting to as much as 60° F. in 24 hours.

Spring is generally a short and chilly season, but the transition to summer is often extremely rapid. The autumn is exceedingly pleasant, and even after a fall of snow, which may occasionally occur early in November, a period of almost summer weather is experienced, generally known as the Indian summer.

The severity of winter seldom sets in until the close of December; frost generally continues from Christmas to April. The cold weather is usually dry and the summer heat regular and temperate; the autumn is, however, the most enjoyable season.

The climate is healthful and favorable to agriculture—in some districts grapes and peaches ripen in the open air; fogs are not considered unhealthful, but probably on account of the sudden changes of temperature chest diseases are prevalent, while agues and malarial fevers are unknown.

The comparatively mild climate enjoyed by Nova Scotia seems to be attributable in some degree to the influence of the Gulf Stream, which prevents the harbors of the Atlantic from being frozen during the winter like those on the northern shore of the Province.

Rain and snow.—In Nova Scotia the average annual rainfall is 39.59 inches; average snowfall 72.1 inches.

In New Brunswick the average annual rainfall is 31.91 inches; average snowfall 99.1 inches.

Cape Breton Island is of an irregular triangular shape; on its western coast the only harbor is Port Hood, but its other sides are rugged and indented with numerous bays. An inlet, the Bras d'Or, enters the northeastern side of the island and forms a lake some 45 miles long, which is continued by a ship canal to St. Peter Bay, on the southern coast; being deep enough for large vessels, it affords great facilities for commerce.

The chief towns are Sydney, North Sydney, and Glace Bay.

In this island there are several ranges of hills, and the northern promontory is a plateau which rises to the height of 1,200 feet. The prevailing rocks belong to the carboniferous system, interrupted in places by igneous or metamorphic rocks. Coal, limestone, gypsum, iron, and slate are found, and salt springs exist.

Products.—The principal exports of the island are timber, fish, iron ore, and coal. Oats, wheat, turnips, and potatoes are extensively cultivated; horses, cattle, and sheep are reared, and cheese and butter produced. The chief coal mines are near Sydney, and at Cow and Glace bays.

Numerous fresh and salt water fish are found.

Climate.—The climate of Nova Scotia and Cape Breton Island is healthful and milder than that of any other part of the Dominion, the average temperature being 65° in the summer and 25° in the winter, but the range is from 96° above to 32° below zero. The average annual rainfall is 38 inches, and the snowfall 75 inches, evenly distributed. Fogs are frequent on the coasts, but they do not extend far inland.

Winds and weather.—Over Nova Scotia and New Brunswick the prevailing winds depend upon the general condition of atmospheric pressure over the American continent and Atlantic Ocean. During the summer months, from April to October, an area of low pressure exists in the neighborhood of the entrance to Davis Strait, and an area of high pressure in the neighborhood of the Azores, and, consequently, the prevailing winds are from the southwestward over Nova Scotia and New Brunswick. In the winter months the area of low pressure is near Iceland and the area of high pressure over the central part of North America, and, consequently, the prevailing winds are from the northwest over Nova Scotia and New Brunswick.

Though these are the prevailing winds throughout the year, they are liable to interruption from the passage of local depressions over or near the Provinces. The passage of such depressions causes the wind to shift in accordance with the well known law that if an observer be in the right-hand semicircle of the advancing depression, the wind will shift to the right, and if in the left-hand to the left, consequently if the wind shifts to the right the depression is passing north of the the observer; if to the left, the depression is passing south of the observer—that is, in the Northern Hemisphere—and if the wind continues steady in direction and increasing in force, the depression is advancing in a straight line toward the observer. Right and left hand semicircles relate to the direction of the path of the storm.

The prevailing winds in the Bay of Fundy during the summer are from the southward to southwestward, and in autumn from the northward to northeastward; generally strong. Winds from south to southwest usually bring fogs; from west to north dry, clear weather; winds from northeast to southeast are generally accompanied by rain; southerly winds shift to the westward and northwestward.

Gales.—Strong gales of wind do not often occur in May, June, or July, but during the hurricane months in the West Indies the path of the cyclonic storms occasionally passes over Nova Scotia and New Brunswick, so that after the middle of August gales are often of great strength, and it then becomes essential to attend carefully to the indications of the barometer. The barometer falls with strong winds between east (through south) and west-southwest; when, therefore, these winds begin to abate, and the barometer at the same time ceases to fall, a change of wind, more or less sudden, to the opposite direction may be expected, with a rising barometer and fine weather; if it be winter, the change will probably be accompanied by intense frost.

Again, a high barometer, stationary or beginning to fall, indicates that a southeast or southwest wind, with accompanying rain and fog, is not far distant; and if at the same time there be a bank of clouds rising above the northwestern horizon the indication is certain.

Storm signals.—There are meteorological stations at Halifax, St. John, and Fredericton.

Storm warnings are issued from the central meteorological office at Toronto, and the following signals are shown at Camperdown (Halifax), Canso, Digby, Halifax, Liscomb, Liverpool, and Yarmouth, West Port (Brier Island) in Nova Scotia, and at Point Lepreau, St. Andrews, St. John, in New Brunswick, and several places on Cape Breton Island.

Day signals.—Moderate gale from an easterly direction, a cone, apex down; and from a westerly direction, a cone, apex up.

Heavy gale from an easterly direction, a cone, apex down, with a cylinder hoisted above it; and from a westerly direction, a cone, apex up, with a cylinder hoisted below it.

Night signals.—Easterly gales: Halifax and Camperdown, two white lights, placed vertically; other stations, easterly gales one red light.

Westerly gales: Throughout Canada, two lights placed vertically; one red over one white light.

A moderate gales is one having a velocity of less and a heavy gale a rate of more than 40 miles an hour.

International code signals.—This code is in use at the signal stations.

Fogs—North Atlantic general.—The percentages of fogs on the North Atlantic are shown on the Pilot Charts, published by the United States Hydrographic Office for each month of the year.

Nova Scotia.—On the southeast coast of Nova Scotia fogs are prevalent all the year round.

With winds from seaward occasional fogs will generally be experienced during the months of January, February, and March; fogs or rain in the months of April, May, and June; dense fogs or rain during July, August, and September; and occasional fogs for the remaining three months of the year.

In winter the rain is frequently replaced by snow. During the autumnal and winter months, winds from between north and west become more frequent, and, being off the land, are always accompanied by clear weather.

On the coast of Nova Scotia, eastward of Brier Island, the fog usually clears for a short distance off-shore when the wind is to the southward of southwest, and on proceeding to the eastward the belt of clear increases in breadth.

Fog—Bay of Fundy.—At the entrance to the Bay of Fundy the fogs frequently give but little warning, and generally follow southerly or southwesterly winds, which bring with them heat and moisture from the Gulf Stream; they chiefly prevail during the months of July and August, and hang principally on the coast between Cape Sable and Brier Island and the vicinity of Grand Manan Island.

But during fogs at Grand Manan Island, with southerly and southwesterly winds, it frequently happens that a clear space, about 1 mile in extent, will be found off the northern part of the island, a fact which should be borne in mind, as it may facilitate making a good landfall.

On the coast of New Brunswick the fog generally clears with the wind to the westward of west-northwest.

It is reported that the thick fogs of the Bay of Fundy do not usually extend farther into the Minas Basin than Cape Sharp, eastward of which the weather is generally clear.

Smokes.—During the summer months the haze, occasioned by the smoke from burning forest in the neighboring State of Maine, is almost as bad as fog, being frequently of sufficient density to obscure lights at night when only a short distance from them.

When within sight of land in foggy weather the usual effect of the fog is that of causing estimations of distances to be erroneously in excess. No great reliance should be placed upon an assumption of position depending upon the distance at which the sound of surf breaking on a rocky shore can be heard, but on many portions of the coast where steep cliffs extend to the shore, the proximity of a steamer to them may be detected by the echo of the whistle. There is no safe guide but the constant use of the lead.

The expression "foggy weather" embraces all conditions of the atmosphere rendering objects indistinct.

Fog signals.—The Canadian Government has adopted the diaphone horn as the best means of indicating a fog; it is stated to be more distinctive in character and penetration than either the compressed air horn or siren, or the fog explosive, all of which have been found unsatisfactory; its apparatus also is portable, and less expensive to work. Submarine bells are also in use. These bells are reported to have been heard from distances of 10 and 12 miles. The mechanical apparatus has not yet been perfected, and may become deranged, especially on the coast of Nova Scotia, where the sea is heavy.

Ice.—One of the chief dangers to which vessels are exposed in crossing the North Atlantic lies in the probability of encountering masses of ice, both in the form of bergs and of extensive fields of solid compact ice, released at the breaking up of winter in the Arctic regions, and drifted down by the Labrador Current across the direct route, and it is for this reason that more southerly routes have been adopted by trans-Atlantic steamers.

It seems that trans-Atlantic steamers plying from Boston, New York, and other southern ports would find it to their advantage to keep to the southern lanes, for what they lose in distance they gain in better and clearer weather, greater speed, and safety. Many of the Canadian steamers take the northern route on account of the shorter distance. These men expect ice and are prepared for it. Ice is more likely to be encountered in this route, between April and August, both months inclusive, than at other times.

The Pilot Chart shows the limits within which both field ice and icebergs may be met with, and where they should be carefully looked out for at all times, but especially during the spring and summer seasons. From this chart it would appear that while the southern and eastern limits of field ice are about Lat. 42° N. and Long. 45° W., respectively, icebergs may be met with much farther from Newfoundland.

Exceptional instances are on record of icebergs being seen within 60 miles of Corvo, the northwestern island of the Azores. In April, May, and June, from 1904 to 1913, inclusive, as far south as Lat. 37° 50′ N. and as far east as Long. 38° W. Exceptional drifts have occurred almost down to Lat. 30° N., and between Long. 10° and 75° W. in these months as well as during other seasons of the year. Between Newfoundland and the fortieth parallel floating ice may be met in any month, but not often from August to December.

Under ordinary circumstances, the ice does not reach as far southward as Cape Race before April, so that vessels leaving England in March by the northern route can often reach the Gulf of St. Lawrence or the United States coast without being impeded by it.

Field ice.—The ice which makes its appearance on the Grand Banks during the month of February is of the kind known as "white" or "northern slob," succeeded during the latter part of the month by field ice. The number of bergs encountered is generally small, in direct contrast to the character of the ice seen during the later months of May, June, and July, which consists almost exclusively of bergs or true Greenland ice. This white slob is the surface ice which is formed to the northward and eastward of Labrador during the early winter months and is crushed up by the wind and sea and built upon as it journeys southward. It is usually found in masses several miles in extent and varying from 3 to 10 feet in thickness.

The fields of ice encountered to the eastward of the Grand Banks are in general detached masses, due either to a temporary diversion of the stream or to the separation of fields of limited area from the main body, the primary cause in both cases being the prevalence of heavy westerly gales. During February these detached fields are reported most frequently northward of the forty-fifth parallel and between the meridians of 46° and 49°. The capacity of this early ice depends to a large extent upon the character of the early winter months in the higher latitudes in which the slob is formed.

The appearance must decide whether a vessel is warranted in trying to force her way through. In a smooth sea where doubt exists should a vessel go dead slow into the mass, there will be but little danger in attempting it and if too heavy she can haul out. Often the weather edge is the heaviest from being rafted, when to leeward it may be scattering. An ice field will often form a good lee for riding out a gale of wind, as it will break the force of the sea. But care is necessary not to lie too close, for the pans are often given such a force that they will stave in the bows of the strongest vessel.

Ice fields have been fallen in within the latitude of Cape Race on the meridian of 45° W., and also in Lat. 42° N. and Long. 50° W.

The Virgin Rocks are usually surrounded by ice until the middle of April or the beginning of May. On the southern coast of the Avalon Peninsula, Newfoundland, the ice usually remains stationary in a compact mass.

The locality in which ice of all kinds is most apt to be found during the months of April, May, and June lies between latitude 42° and 45° and longitude 47° and 52° west of Greenwich. Here the Gulf Stream and the Labrador Current meet, and the movement of the ice is influenced sometimes by the one and sometimes by the other of these currents.

The bergs which follow the slob and field ice are detached portions of the true polar ice formed upon the land and carried down to the sea by glacial action.

Icebergs assume the greatest variety of shapes from those approximating to some regular geometric figure to others crowned with spires, domes, minarets, and peaks, while others still are pierced by deep indentations or caves. Small cataracts fall from the large bergs, while, from many, icicles hang in clusters from every projecting ledge. They frequently have outlying spurs under water, which are as dangerous as sunken reefs. For this reason it is advisable for vessels to give them a wide berth, for there are cases on record where vessels were seriously damaged by striking when apparently clear of the berg.

It is generally best to go to windward of an iceberg, because the disintegrated fragments will have a tendency to drift to leeward while open water will be found to windward. Serious injury has occurred to vessels through the breaking up or capsizing of icebergs. Often the bergs are so nicely balanced that the slightest melting of their surfaces causes a shifting of the center of gravity and a consequent turning over of the mass into a new position, and this overturning also frequently takes place when bergs, drifting with the current in a state of delicate equilibrium, touch the ocean bottom.

These icebergs are sometimes over 200 feet in height and of considerable extent; they have been seen as far south as Lat. 37° 50′ W., to obtain which position they must have crossed the Gulf Stream impelled by strong winds and currents. On the Great Bank of Newfoundland bergs are often observed to be moving southward or southeastward; those that drift westward of Cape Race usually pass between Green and St. Pierre Banks.

The winds have a marked effect on icebergs, directly and indirectly. Indirectly by influencing the current, and directly but in a less degree on the bergs themselves. Many authorities have asserted that it is only field ice that is blown about, and the wind has no effect on icebergs except as it influences the current. It is true that the current is the controlling factor, but it is not true that the wind has no direct effect. Although the mass of an iceberg under water is about eight times that out of water, it does not necessarily follow that the depth is eight times the height. All bergs are irregular in shape and many of them have high sides and pinnacles but a flat base. Such bergs are greatly exposed to the wind and influenced thereby. Often an iceberg is seen drifting directly to windward. This is because the current is stronger than the wind. The direction of drift of a berg is the resultant of wind and current. If a berg be in slack water strong northerly winds will drive it southward and southerly winds northward. The wind, surface current, and swash of the sea all have their effect. A small berg will go to leeward faster than a large berg and a high berg faster than a low one of equal size.

The amount of ice and its location and movement are so variable from year to year, while the region occupied in its formation and transportation is so vast and so little under special observation that no successful system of prediction has as yet been instituted. The most that can be said now is that after an exceptionally open winter in the Arctic we may expect the ice to come south earlier and in greater quantity. After such a winter the East Greenland current starts the ice stream around Cape Farewell from one to three months earlier, and this advancing of the season is reflected by a corresponding advance in the Labrador Current and on the Newfoundland Bank. The greatest calving at the glaciers of Greenland follows the breaking up of the shore ice and hence the bergs also start southward earlier and with more freedom after an open winter.

Caution—Safety in ice regions.—It is impossible to give any distinct idea of where ice may be expected, and no rule can be laid down to insure safe navigation, as its position and the quantity met with differ so greatly in different seasons. Apparently the only safe way to navigate regions of icebergs is to stop during thick weather and to run very slowly on dark nights. Everything must depend upon the vigilance, caution, and skill with which a vessel is navigated when crossing the dangerous iceberg region of the Atlantic Ocean. In addition to this, the vigilance of the officer of the watch should be unremitting.

Signs of the proximity of ice.—(Extracts from reports of the ice patrol from 1912 to 1914.) The proximity of ice is indicated by the following-described signs:

Before field ice is seen from deck the iceblink will often indicate its presence. On a clear day over an ice field on the horizon the sky will be much paler or lighter in color and is easily distinguished from that overhead, so that a sharp lookout should be kept and changes in the color of the sky noted.

On a clear day icebergs can be seen at a long distance owing to their brightness; during foggy weather they are first seen through the fog as a black object. In thick fog the first sight of a berg is apt to be a narrow streak of dark at the water line.

They can sometimes be detected by the echo from the steam whistle or the fog horn. In that case, by noting the time between the blast of a whistle and the reflected sound, the distance of the berg in feet may be approximately found by multiplying by 550. The absence of echo is by no means proof that no bergs are near, for unless there is a fairly vertical wall, no return of the sound waves can be expected; air echoes are erratic and not to be relied upon.

The presence of icebergs is often made known by the noise of their breaking up and falling to pieces. The cracking of the ice or the falling of pieces into the sea makes a noise like breakers or a distant discharge of guns, which may often be heard a short distance.

The absence of swell or wave motion in a fresh breeze is a sign that there is land or ice on the weather side.

There is no appreciable change of temperature, air or water, when approaching a berg. If a fresh wind be blowing and you get within a hundred yards or so to leeward, one experiences a sensation of cold, but the thermometer may not register any drop. And when a vessel unwittingly gets that close to a berg, she would be in a serious danger.

Cold water does not necessarily indicate ice, but ice is likely to be found in cold water and not in warm water. Consequently, when encountering water below 40° in spring and below 50° in early summer, it is well to be on guard for ice. In foggy weather it is advisable for vessels to keep in water above 50° while crossing the ice zone, thereby avoiding both ice and fog.

Birds do not necessarily indicate presence of ice. They are more numerous around vessels where they can find something to eat.

There is no iceblink over a berg as some have asserted, but it is noticed over field ice.

A reliable sign of icebergs being near is the presence of calf ice. When such pieces occur in a curved line, as they may do, especially in calm weather, the parent berg is on the concave side of the curve.

No mariner can afford to trust any of the above-named signs to the exclusion of a good lookout; he must depend on his eyesight alone; he should navigate cautiously in a fog or at night and keep to the southward when passing the ice zone.

Current information regarding ice conditions.—The branch hydrographic offices receive daily the latest information regarding ice and other obstructions to navigation, being furnished with the reports of passing vessels and the ice-patrol vessels, as long as such are in service. They also distribute the publications of the Hydrographic Office dealing with this topic, namely, the Hydrographic

Bulletin (weekly) and the Pilot Chart (monthly), as well as the pamphlet on North Atlantic Ice Patrols (Reprint No. 24).

Harbor ice.—The smaller and landlocked harbors of the coast of Nova Scotia are, in general, all frozen over during the two or three coldest winter months; and so also are the larger harbors, excepting for short distances within their entrances, which are kept open by the swell from the southward. The coasting vessels are usually laid up in consequence from about the middle of December to near the end of March.

Halifax Harbor has been frozen over three times only since 1850, and on no occasion for more than a short time; it may therefore be considered to have the advantage of never being closed by ice unless under most exceptional circumstances. A thick coating of ice formed in the harbor in the unusually severe winter of 1874–75.

Owing to the great rise and fall of tide in St. John Harbor it is stated that the formation of ice within the harbor is impossible; also that field ice never drifts into the entrance of the harbor from the Bay of Fundy. The ice which forms in the St. John River terminates about 3 miles above the falls at the narrows and is prevented by them from escaping into the harbor; when the ice breaks up in the spring it is in a rotten condition and completely pulverized in coming down over the falls.

Ice breakers.—The Canadian Government has ice-breaking vessels for keeping the channels clear.

Ice patrol service—Trans-Atlantic steamer routes.—For the purpose of carrying on the ice observations and ice-patrol service provided for by the International Convention for the Safety of Life at Sea, London, 1913–14, each year thereafter a United States Coast Guard cutter leaves New York on or about February 15 and proceeds to the Grand Banks of New Foundland to locate the ice fields and icebergs, making such observations as practicable on the quantity of ice, its kind, extent, and drift, and obtaining any other information that may seem to be of value.

The object of the patrol is primarily to ascertain the location and progressive movement of the limiting lines of the regions in which icebergs and field ice exist in the vicinity of the Grand Banks of Newfoundland and to disseminate this information for the guidance and warning of navigators. Coordinately with these primary duties the cutter will make such oceanographical and meteorological observations as will contribute toward a knowledge of the causes why the limiting lines assume their observed locations.

During the period of ice observations the cutter is the only vessel employed on this duty, but when the ice has moved southward so as to make a constant patrol necessary an additional vessel will be detailed for that purpose.

The experience of previous years has shown that a continuous ice patrol should be established about April 1, and continued throughout the season of dangerous ice conditions.

Upon getting in touch with the ice the cutter sends a report daily to the Branch Hydrographic Office, New York City, at 4 a. m., seventy-fifth meridian time, addressed "Hydrographic, New York." An endeavor is made to communicate direct with coast radio stations, but should the cutter be unable to communicate with any of these stations, the message is relayed through any vessel within reach.

The ice information is given in as plain and concise English as practicable and states the following:

(*a*) Ice (berg or field).
(*b*) Date.
(*c*) Time (seventy-fifth meridian).
(*d*) Latitude.
(*e*) Longitude.
(*f*) Other data as may be necessary.

While on this duty the patrol vessel endeavors by means of daily radio messages to keep vessels at sea advised of the limits of the ice fields.

Radio stations.—There are radio stations at the following places:

North Sydney, call letters VCO.

Sable Island, open always, call letters VCT.

Camperdown Heights (Halifax Harbor), open always, call letters VCS.

Cape Sable, open always, call letters VCU.

Partridge Island (St. Johns Harbor), open always, call letters VCV.

The following messages are transmitted and received free of charge at all stations:

Between the master of a vessel and any Government department or Government official.

Between the master of a vessel and the officer in charge of any radio station.

Between the master of a vessel and any person whosoever in connection with weather conditions and forecasts, tide conditions, ice, or reports on aids to navigation.

Masters of vessels equipped with radio apparatus are requested to forward through the Government radio stations any information they obtain respecting defects in aids to navigation or any other items that would tend to the safety and protection of navigation. The receipt of such information will be acknowledged in writing to the master by the departmental agent receiving the same.

Lloyd's signal station.—There is a signal station at St. Paul Island, Cape Breton, with which passing vessels may communicate with Lloyd's.

Signals to be made by vessels approaching defended ports when inconvenienced by searchlights.—Any vessel approaching a defended port in the British Empire when searchlights are being worked, and finding that they interfere with her safe navigation, may make use of the following signals, either singly or combined:

(*a*) By flashing lamp, four short flashes followed by one long flash.

(*b*) By whistle, siren, or foghorn, four short blasts followed by one long blast.

Whenever possible both flashing lamp signals and sound signals should be used.

On these signals being made the searchlights will be worked so as to cause the least inconvenience, being either doused, raised, or their direction altered.

The signals should not be used without real necessity, as unless the vessel is actually in the rays of the searchlight it is impossible to know which searchlight is affected.

NOTE.—The signals are designed to assist mariners and do not render the Government liable in any way.

Coal.—Coal is found in large quantities in Nova Scotia and New Brunswick, in many cases workable deposits of coal, iron, and gold being in close proximity to each other.

The Cumberland coal fields in the Bay of Fundy are estimated to cover about 200,000 acres, the coal obtained being largely used for steaming and domestic purposes.

The only coaling stations, where over 500 tons of coal are kept in stock, are Halifax, Yarmouth, St. John, and Parrsboro. The amount kept in stock and facilities for coaling will be found under the description of these places.

Time signals.—Time signals are made at Halifax, at St. John, New Brunswick, and at Camperdown by radio.

Standard time.—The standard time kept in Nova Scotia is that of the meridian of 60° W., or four hours slow on Greenwich mean time. The standard time kept in the Province of New Brunswick is that of the meridian of 75° W., or five hours slow on Greenwich mean time.

The standard time of the sixtieth meridian is kept by all branches of the marine department in the Maritime Provinces, and also by the Canadian Pacific and Intercolonial Railways throughout the three Maritime Provinces.

At Camperdown (Nova Scotia) Radio Station the time signal from land lines from Halifax is automatically repeated at the instant of

1h. 00m. 00s. p. m., standard mean time. Navigators find this method useful and practical for checking chronometers at sea.

Ship duties—Sick and distressed mariners.—Every vessel arriving at any port in Nova Scotia or New Brunswick has to pay 1½ cents for every registered ton into the customhouse of the port. Vessels of more than 100 tons pay this duty three times, but not oftener, during one year; vessels of 100 tons or less not oftener than once each year.

Hospitals.—Marine hospitals are maintained at Yarmouth and Lunenburg. At Halifax provision is made for the care of sick seamen at the Victoria Hospital. At ports where no hospitals are established such seamen are cared for under the chief officer of customs.

Lifeboats are stationed at Sable Island, near the main (west), middle, and east flagstaffs; Whitehaven; Devils Island, Herring Cove, and Duncan Cove in entrance of Halifax Harbor; Port Mouton; Negro Harbor; Cape Sable; Seal Island; Yarmouth Harbor; Little Wood Island, Grand Manan; and at West Quoddy Head.

Pilotage.—The Governor General, in council, may impose or repeal pilotage dues in any district.

Pilots are licensed by the pilotage authorities when examined and found competent. They are directed to offer their services unsolicited. The employment of pilots is not compulsory, but payment of pilotage dues in many districts is compulsory, whether the pilot has been employed or not.

British naval vessels and Canadian Government vessels are exempt from pilotage dues, as also is any inward bound vessel when no pilot has offered his services. There are also other exemptions, the particulars of which must be obtained locally.

Nova Scotia pilots for Halifax Harbor may be obtained from one of the schooners which cruise off Chebucto Head a few miles apart and within a radius of 15 miles from it. In the winter, or whenever the weather is too bad for the schooners to be out on their station, the pilots board in a large pulling boat from a small cove immediately under Chebucto Head and just to the westward of it. Under these circumstances a vessel must be fairly close in before the pilots will come off. Sometimes, if the weather is too bad to board a vessel, the schooner, if out, will run in ahead and pilot the vessel until smooth water is reached.

Pilot schooners carry a flag with two horiozntal red and white bands, and, unless met with at sea, vessels approaching Halifax Harbor requiring a pilot should hoist their colors by day, and at night or during foggy weather a gun should be fired. Fishermen having local knowledge may be employed for some harbors on the southeast coast of Nova Scotia, but it must not be expected that they can have any experience of piloting vessels of heavy draft.

Bay of Fundy pilots.—With the exception of the St. John and St. Andrew pilots, and possibly a few at Yarmouth, there are no regular pilots for the Bay of Fundy. The fishermen and coasters are generally well acquainted with the dangers and set of the tidal streams in the localities they are accustomed to frequent, but as a rule they are not well informed respecting the depth of water.

St. John pilot boats will generally be found to the southward of the line between Gannet Rock Light and the Brier Island, and between Machias Seal Island and Little River, on the coast of Maine.

Pilots are always on the lookout and are sometimes fallen in with in the vicinity of Machias Seal Island; during a fog, by firing a gun occasionally, they will generally find the vessel.

It is very desirable that vessels requiring a pilot should take one before entering St. John Bay, for instance, at Point Lepreau, if not farther down, for during thick weather the rapid streams, particularly during the freshets, render the navigation of the bay unsafe to a stranger. Tugs are always available off the harbor mouth and occasionally off Point Lepreau.

Nova Scotia Banks.—When approaching the Gut of Canso from the Atlantic the banks which lie off the the coast of Nova Scotia must be crossed. The northeastern edge of these banks runs approximately from St. Paul Island to latitude 44° 30′ N., longitude 57° 5′ E., whence the southern edge takes a general west-southwest direction.

Soundings have not been obtained on the banks numerous enough to justify much confidence being placed in a position assumed from depths alone.

The shoalest parts of the northeastern of these banks, which are separated from each other by depths usually less than 100 fathoms, but which reach 180 fathoms, are:

Banquereau Bank, extending from about latitude 44° 30′ N., longitude 57° 20′ W., westward to the meridian of longitude 60° W., a distance of about 120 miles, with a greatest width of some 36 miles, is a plateau of sand, gravel, and shells, with 15 to 50 fathoms water, and may be distinguished from contiguous banks by the numerous flat sea eggs without prickles which are found on its bottom. The shoalest part of Banquereau Bank, with 15 fathoms, in latitude 44° 35′ N., and longitude 57° 54′ W., is the apex of a ridge, having less than 30 fathoms water, about 45 miles in length, in direction about 30° true, and some 12 miles in width. This bank is separated from Bank St. Pierre of the Great Bank of Newfoundland by a deep channel, nearly 60 miles wide, with general depths of over 200 fathoms, muddy bottom; and from the northeast bar of Sable Island by the Gully, which is 8 miles across its narrowest part and 340 to 75 fathoms deep.

Misaine Bank lies northward of Banquereau Bank, and between it and Scatari Island.

The least water yet found on this bank is 36 fathoms, on its southeastern side, the general depth being over 40 fathoms, with a bottom of stones and broken shells. The outline of the bank is very irregular; its eastern limit is in Lat. 45° 30′ N., Long. 57° 58′ W. Between Misaine Bank and the bank extending from Cape Breton Island there is a deep gully, some 25 miles wide, and with a depth of 70 to 162 fathoms.

Canso Bank.—The northwestern end of this bank lies about 16 miles southeastward of Cape Canso, and its eastern side is separated from Misaine Bank by a space about 17 miles across, in which are depths of 54 to 79 fathoms, and some patches of 46 to 49 fathoms.

The least water on Canso Bank, which extends about 30 miles east and west, and some 18 miles north and south, is 35 fathoms, sandy bottom, in Lat. 45° 9′ N., Long. 60° 12′ W. The bank is separated from the northeastern end of Middle Bank by a space of deep water with 100 to 180 fathoms, and from the bank extending from Cape Canso by a narrow deep water channel with 84 fathoms.

Middle Bank, about 30 miles to the northward of the west end of Sable Island, has 10 fathoms least water, this depth being found at the extreme southeastern end of the bank, in Lat. 44° 24′ N., Long. 60° 8′ W.; there is also a depth of 15 fathoms toward the northwest extreme. The bank is nearly 40 miles in length, northwest and southeast, with depths varying generally from 10 to 30 fathoms, and is separated from the west end of Banquereau Bank by a gully 5 miles across, with a depth of 100 fathoms. Its northern end extends to within 35 miles of Cape Canso, the bottom between being a submarine valley, with a depth of 140 fathoms in one position. The center of this bank is on the same parallel as the entrance to Halifax Harbor; the soundings on it can therefore be used with advantage when approaching that port in foggy weather.

Artimon Bank, situated at the eastern end of the deep water gully separating Misaine and Banquereau banks, is of small extent, the least water being 37 fathoms, over a bottom of stones with starfish and sea eggs, in Lat. 45° 10′ N., Long. 58° 7′ W.

Sable Island, about 85 miles southward of Whitehead Island, the nearest part of Nova Scotia, is shaped like a bow, concave to the northward. In a direct line between the extremities of the island it is 21.5 miles long, about 79° and 259° and 1.5 miles across in its widest part.

Some parts of Sable Island are covered with grass, but in other parts the wind has scooped out crater-shaped hollows or thrown up the sand into hills, the highest of which, also the summit of the island, is Rigging Hill, 110 feet high, on the northern coast of the island, about 4.5 miles westward of the eastern lighthouse. The positions of these sand hills are frequently changed by the wind.

Lake Wallace, a salt-water pond from 5 to 12 feet in depth, extends from the western end of the island for about 11 miles between the sand ridges, and is said to be gradually filling with blown sand.

New land is being formed gradually on the bar at the eastern end, vegetation appearing where it was formerly covered with water, and the sea now covers land at the western end where vegetation was formerly seen.

From a distance of 9 or 10 miles to the northward the island appears to be a long range of sand hills, some of which are very white; from the southward the range of white sand appears more continuous and very low toward the western end.

Productions.—The amount and variety of vegetation on this gigantic sand bar is extraordinary. Besides two kinds of grass, there are wild peas and other plants, affording subsistence to wild horses and rabbits, as well as to the domestic cattle belonging to the establishment; there are no other animals on the island, excepting rats, which have come on shore from wrecks. There are also four or five kinds of edible berries in great abundance and many flowers and shrubs.

Fresh water can be obtained in almost any part by digging down a few feet into the sand. Seals and abundance of wild fowl frequent the island in their seasons.

The fisheries around the island are exceedingly valuable, but the danger of remaining near its formidable bars has hitherto restricted the number of vessels engaged in them.

Sable Island (East End) Light, group flashing white, elevated 123 feet above high water, visible 17 miles, is shown from an octagonal wooden tower, painted alternately white and brown, surmounted by a red circular iron lantern, the whole structure being 81 feet high, situated 1.3 miles westward of East Point and 5 miles southwestward of the extremity of East Dry Spit.

Sable Island (West End) Light, flashing white, about 120 feet above high water, visible 16 miles, is exhibited from a skeleton steel tower with wooden slats on the upper portion of the tower below the watch room, the steel work is painted black, the oil shed, slats, and watch room, white, and the lantern and staircase tube red.

The new tower is 4,000 feet 91° from the old tower which was left standing and is painted white.

Life-saving stations.—The western or main station on Sable Island for the relief of shipwrecked persons is situated on the northern side of the island near the main flagstaff, between the lake and the sandhills.

There are three other stations to the eastward, spaced about 4½ miles apart. There is a flagstaff with a crow's nest at each station for keeping a lookout for wrecks or vessels in distress.

During fogs and snow storms mounted men patrol the beach to ascertain if any wrecks have taken place, and on all occasions the entire shores of the island are patrolled by mounted men, early in the morning and late at night, when the shores can not be seen from the stations.

Radio.—A radio station is established on Sable Island, the mast of which is located on the summit of a sand hill 1.2 miles eastward of the main flagstaff and 300 yards southward from the northern shore of the island.

West Point, the western extremity of Sable Island, dries about ¾ mile from the end of the grassy sand hills. There are several patches nearly dry extending about 1.3 miles farther out.

West Bar, extending about 9 miles from West Point, is marked by heavy breakers; from thence westward for the distance of 7 miles the depth increases from 4 fathoms to 10 fathoms, and over this part there is usually in bad weather a great ripple and a heavy cross sea. The direction of this bar is about 303° for the first 12 miles, thence 266° for the remaining distance; the whole extent of the bar from the end of the grassy sand hills to the depth of 10 fathoms being 22 miles, beyond which distance the water deepens gradually to the westward for many miles. The sea has encroached on the land and covered places where grass formerly grew, threatened the destruction of the western lighthouse, necessitating its removal on two occasions farther to the eastward.

In consequence of the submergence in former years of part of West Bar and the necessitated removals of the lighthouse eastward, mariners are cautioned that there will probably be increased danger in navigating in the vicinity of the western end of Sable Island.

Rock.—A ridge-shaped rock has been reported to exist about 250 feet long, in a northeasterly and southwesterly direction, and 50 feet in breadth, with a least depth of 2½ fathoms over it and 37 fathoms around it, in approximately Lat. 44° 8′ 30″ N., Long. 60° 29′ W.

East Point is the end of the grassy sand hills; during fine weather a sand spit dries fully 4 miles from it. At the distance of 1.8 miles from East Point, a small sandhill about 6 feet high, and with some grass on it, has accumulated around a wreck since 1820. Since 1852 the sea has receded, and vegetation now appears in places which were formerly covered by water.

East Bar during fine weather dries about 3.5 miles from East Point, the end of the grassy sand hills. The 3.5 miles of dry sand are succeeded by 8 or 9 miles of heavy breakers, the whole length of this bar from the grassy sand hills to the depth of 10 fathoms being 14 miles. Its direction is northeastward for the first 7 miles, beyond which it curves gradually to the eastward till it terminates. The ridge of sand, with a depth of from 10 to 13 fathoms on it, and with often a heavy cross sea, continues for 10 miles farther to the eastward and then ends abruptly, the depth increasing in a distance of 3 miles farther in the same direction to 170 fathoms in the channel between Sable Island and Banquereau Bank.

Dry bar.—A dry bar has formed off the eastern end of Sable Island, about 2 miles inside the eastern extremity of the East Bar, as charted.

The bar is about 50 yards in extent and dries 3 feet at low water.

There is deep water outside the main bank 16 miles from Sable Island (East End) Lighthouse.

At a distance of 2.3 miles northeastward from the East End Lighthouse a hut has been built to serve as a shelter for mariners wrecked on East Bar. This hut contains fuel, provisions, and water and is connected with all the stations by telephone.

Sable Island and its submerged bars form a crescent, concave toward the northward, and extend over more than 50 miles of sea. Vessels should be careful not to be caught within this crescent in a strong gale from the northward, when the accelerated ebb tide, setting directly toward and over the bars, would render their situation extremely dangerous. Both the bars are extremely steep on the northern side, East Bar especially so, having 30 fathoms of water close to it. To the southward, on the contrary, the water deepens gradually for many miles and renders it difficult to account for the great number of shipwrecks on that side of the island and its bars, unless they are to be attributed to the neglect of the lead.

Wrecks on the bars are far more dangerous to life than those that take place on the island, and it is important in such cases to know on which bar the vessel is and the consequent direction in which to seek for safety on the island. This information, when the island is hidden by fog or the darkness of night, must be sought by observing the direction of the line of breakers, which on East Bar is between 33° and 67° until near its outer extremity, while on West Bar it is 297°.

A bar, drying 3 feet at low water, has formed northeastward of Sable Island, on East Bar, 9.5 miles 53° from East End Light.

Anchorage.—Off the northern side of Sable Island, except near the eastern end, where the deep water approaches too near the shore, there is good anchorage in 5 to 10 fathoms from 1 to 2 miles offshore. The bottom is fine sand and holds well, but the sea is so heavy, except with offshore winds, that a vessel should weigh immediately on first indications of a wind from seaward.

Directions.—In approaching the anchorage off Sable Island from the northward at night or in thick weather the lead should be kept constantly going; and after passing Middle Ground, distant about 25 miles to the northward of the island, great caution should be used and the vessel should be certain of her position, for the eastern end of the island and East Bar are very steep on that side.

Vessels seldom anchor off the southern side of the island because of the prevailing heavy swell from the southward; but they may safely approach by the lead on that side, taking care not to become becalmed in a heavy swell and in the strong and uncertain tides and currents near the bars.

Should vessels run ashore on Sable Island and be in danger of being wrecked, the crews are urged to remain by the vessel until assistance can be rendered by the life-saving staff on shore.

Former experience shows that all attempts to leave in the vessel's boats have resulted in loss of life, but that in every case where assistance from the shore, either by line-throwing apparatus or lifeboats, has been awaited the crew has been saved.

Landing is, in general, impracticable on the southern side, except after a long continuance of northerly winds, and on the northern side boats can land only during southerly winds and fine weather. The best method of communicating with the island is to anchor in 7 fathoms, ¾ mile 353° from the main station, and signal to the lookout. A surfboat will go out from the station if a landing is practicable, and this boat, with its experienced crew, can land when ordinary boats would swamp.

Tides.—High water, full and change, on the northern side of Sable Island is at 7 h. 30 m., and on the southern side about an hour earlier; springs rise about 4 feet. The tidal currents are much influenced by the wind. The ebb sets to the southward on and over the bars, often at a velocity of 1.5 or 2 knots an hour; the flood at a much less velocity in a contrary direction.

Sable Island Bank, lying between the meridians of 59° W. and 62° W., is about 140 miles long, in an easterly and westerly direction, and about 60 miles wide, its southern extremity being in Lat. 43° 10′ N.

The depths vary from 10 to 50 fathoms, sand, the shoalest portion of the bank lying northwestward of Sable Island.

Emerald Bank, about 9 miles westward of the western extremity of Sable Island Bank, is irregular in form and about 25 miles long north-northwest and south-southeast and 20 miles wide within the 50-fathom curve. The bank has a general depth of from 40 to 45 fathoms, its least depth, 38 fathoms, being at the northeastern end.

Sambro Banks lie with their northeastern end situated about 43 miles southeastward from Sambro Island Lighthouse, whence the banks within the 60-fathom curve extend about 15 miles in a west-southwesterly direction, but the western limit is not clearly ascertained. The general depth upon these banks is from 53 to 57 fathoms, sand and gravel, the least known depth being 49 fathoms. A gully about 5 miles in width penetrates from the westward between Sambro Banks and the Sambro Ledges, in which there is a depth of 100 to 112 fathoms.

Lahave Bank.—The northeastern shoal plateau of this bank with from 45 to 50 fathoms, sand and stones, is 30 miles long and 18 miles wide, the northern end being 68 miles to the southward of Sambro Island Light. Another bank with a depth of 45 to 50 fathoms exists 20 miles westward of the southern end of Lahave Bank, with intervening depths of 50 to 60 fathoms.

Roseway Bank.—The shoalest part of this bank with from 27 to 40 fathoms, stones and pebbles, is about 11 miles in length, with its center on the same parallel as Cape Sable Lighthouse and the northern end of Lahave Bank. Between the 60-fathom curve of Lahave and Roseway banks there is a deep channel, with from 70 to 100 fathoms; while inshore, Roseway Bank is connected by a narrow neck with the 60-fathom curve of the bank extending along the coast.

Browns Bank, within the 50-fathom curve, is 55 miles in length, with an average breadth of 15 miles. It lies to the westward of, but contiguous to, Lahave Bank, and with it forms an almost continuous bank, following the line of the coast off Cape Sable 50 miles from the shore.

Near the western extremity of Browns Bank is a sandy rise about 10 miles long north and south, with from 14 to 30 fathoms, the former depth having been obtained in approximately Lat. 42° 47′ N., Long. 66° 12′ W. This depth lies about 44 miles, 214°, from Cape Sable.

Southwestward of the 50-fathom curve of Browns Bank there is a deep water channel 25 miles wide, separating it from the 50-fathom curve at the northeastern extremity of Georges Bank, off the Massachusetts coast. Northeastward of Browns Bank there is a narrow deep water channel with over 60 fathoms, dividing it from the same depth on the edge of the shore bank, which follows, about 30 miles off, the coast line between the 50-fathom curve, with from 52 to 82 fathoms, from Cape Sable to Brier Island, abreast which the deep water approaches within 5 miles of the shore.

There are many inequalities on the main shore bank off the southwestern coast of Nova Scotia, which it would be useless to describe in detail in these directions, inasmuch as they are clearly shown on the chart, by studying which the navigator will have a comprehensive idea not only of the positions of and depths upon the various small patches, but also of the relative positions of the larger banks.

Approach to the banks is generally evidenced by an increasing number of sea fowl around the vessel. Hagdowns, a species of gulls, heavy of flight, are seen all across the Atlantic, but on the banks they become very numerous, as well as divers and other sea fowl.

Fish.—All the banks off Newfoundland and Nova Scotia abound in cod and other fish, and during the summer season a large fleet of fishing vessels is found at anchor upon them. The ordinary track of the mail steamers is left open, but northward and southward of this unoccupied track numerous American, French, and Canadian vessels are employed in the cod fishery, especially on the Great Bank of Newfoundland, St. Pierre Bank, Banquereau and Green banks, and Middle Ground.

Currents.—From a general point of view the currents are governed by the depth curves, which they follow with great regularity around the Atlantic Basin, the warm currents pushing northward from the Equator with diminished force and the polar currents coming from the north with much greater force than in the summer and running nearer to the surface. Attention should be paid to the bathymetric conditions in the basin, for neither the cold not the warm currents will cross the great deeps; they always circle around them inside of the 2,000-fathom curve. Of the great currents in this part of the ocean, it is generally admitted that the Gulf Stream, after passing along the coast of the United States, is deflected to the eastward between the parallels of 35° and 40° N., and continuing on in about an east-northeasterly direction, passes southward of the tail of the Great Bank of Newfoundland during the winter months, but extends over the southern end of the bank during the summer season.

From a combination of causes, such as prevailing or lately prevailing winds, and the preponderance of polar or tropical waters, the Gulf Stream has been found to have an oscillatory motion, so that it would be impossible to assign any definite limits to the margins of this great ocean river.

The velocity of the Gulf Stream across the southern end of the Great Bank of Newfoundland is very variable, but at times amounts to more than 1 knot an hour in an east-northeasterly direction. One result of this influx of warm water into a cold atmosphere is the production of the dense fogs so frequently experienced on the banks, and which materially embarrass and retard navigation.

Although the current between the Great Bank and Newfoundland commonly sets to the southwestward, sometimes at a velocity of nearly 1 mile per hour, it is not always so; and near the shore, in moderate weather, it even changes with the wind. At these times during the flood it runs to the southwestward and during the ebb to the northeastward, the former being the stronger.

Westward of Cape Race the current frequently sets to the northwestward, at a velocity of about 1 mile per hour in the offing, but it is not invariable in strength or direction, and is liable to be affected greatly by the prevailing wind. It is observed generally to run in upon the eastern side of the great bays indenting the south coast of Newfoundland, and out on their western side. In the offing it is influenced by the winds, and near the shore by the tidal currents, so that, during springs, the current of ebb runs weakly to the southeastward, and the flood to the northwestward, the latter sometimes at a velocity of 2 knots around the headlands.

Upon this shore many wrecks have occurred in foggy weather.

Over the banks southward of Newfoundland, during south or southwest breezes, there is a strong set to the northward, which is still stronger during, and after, a northeast wind. A current to the southward has at times been experienced on the above banks, but it is an exception.

A set of 30 miles in 24 hours to the northward has frequently been experienced over the banks, at times at the distance of 50 miles from the coast. The importance of taking frequent soundings can not too strongly be urged on the seaman.

The ordinary strength of the current is about ½ knot, but it occasionally attains a velocity of more than 2 miles an hour. The fact of the transportation of field ice from the north to Lat. 42° N. indicates the certainty of a current ordinarily setting to the southwest.

Sailing vessels should be careful to keep a good offing, as the wind often falls light near the shore, and the drift of the sea and current may be toward the land, especially near Placentia and St. Marys bays.

Along the southeast coast of Nova Scotia the offshore current generally sets to the southwest, at an average velocity of about ¾ mile an hour, but both direction and strength are much influenced by the wind. After a continuous westerly blow the current will run to the eastward about ½ knot per hour, and after a prevalence of easterly winds the usual southwesterly current is accelerated to more than 1 knot an hour; in either case the set will tend to increase the vessel's distance from the shore.

Arctic, or Labrador Current.—This cold ice-bearing current from the Arctic seas, passing southward along the coast of Labrador at velocities varying from 10 to 36 miles a day, and occasionally ceasing altogether, is very much influenced near the coast by the winds, reaching the maximum velocity after those from the northward; its average velocity is about 12 miles per day. It is difficult to estimate the direction or effect for any particular day, but that the general trend is to the southward is shown by the passage of many icebergs; these, however, have been observed to travel northward without any apparent reason.

Abreast Labrador this cold current appears to extend as far to the eastward as the meridian of 40° W.; from thence in its course to the southward it is met by the northern edge of the Gulf Stream, the position being nearly always distinguishable by the rips caused by the interlacing of the waters of the two currents.

A branch of the Arctic passes through the strait of Belle Isle into the Gulf of St. Lawrence, and reenters the Atlantic through Cabot Strait, flowing in a southeasterly direction, but from the report of the Canadian survey of the tides and currents it would appear that this branch current is not constant, nor is the inflow great. It is frequently deflected to the southward toward Cape Breton Island by northerly winds, though on the Newfoundland shore it often is found to set northward at a velocity of about 1 knot per hour.

To the eastward of Cape Breton Island the current intermingles with the same current, which, after skirting the eastern coast of Newfoundland, turns to the westward round Cape Race, thence passing along the southeastern coast of Nova Scotia continues on to the southward along the United States shore to Florida, preserving in a marked degree its distinctive character as a cold current inside the warm waters of the Gulf Stream.

The formation of the extensive banks of Newfoundland and Nova Scotia is probably to be attributed to the meeting of the diverse currents, for the loose delta of the numerous rivers flowing into the Gulf of Mexico and borne along in suspension by the force of the Gulf Stream, as well as the earthy matter which icebergs are ever bringing from the north, are alike deposited within the comparatively limited space where the two streams come into collision.

Sable Island currents.—The irregularity of the currents in this locality is said to be one of the principal causes of the frequent wrecks that occur on Sable Island. These currents are rendered inconstant and irregular, both in strength and direction, by winds; but their general tendency is a set to the westward, and vessels find no difficulty in working to windward in that direction, anywhere to the northward of the Gulf Stream; hence it is that many vessels wrecked on Sable Island were supposed to have been well to the eastward of its position.

Tidal currents—Nova Scotia coast.—Although on the southeast coast of Nova Scotia the general set of the current in the offing is to the southwestward, sometimes exceeding a velocity of 1 knot per hour, this current is more or less influenced by the tidal currents, which are weak and irregular; also by the wind.

When employed sounding upon the Sambro, Emerald, and other banks lying off Halifax in 1895 and 1896, a British naval vessel found that as a general rule the surface current shifted regularly in the direction of the hands of a watch, completing the circle on the average in a period of about 18 hours. The occasions on which this regularity was interrupted and the current direction was observed to shift in the reverse way were generally, though not invariably, when fresh to strong winds prevailed, which during the sounding season (June to October) were usually from the southward and westward. The greatest velocity of the current observed never exceeded 1.5 knots an hour, and a velocity exceeding 1 knot was probably an acceleration caused by the wind.

Bay of Fundy.—The tidal currents in the offing off Cape Sable are very uncertain both in velocity and direction, and in entering the bay great caution is necessary.

It is reported by a fisherman and other authorities that the tidal stream on Browns Bank, off Cape Sable, occasionally runs to the northeastward for 15 hours continuously at a velocity of 2 miles an hour (which would account for vessels from Boston being so frequently set up the Bay of Fundy), while at other times the set would be as great to the southwestward.

After rounding Cape Sable the current, during flood, sets toward Seal Island, passing it, and through the various channels to the northward between it and Tusket Island, in a general northwesterly direction, at velocities varying from about 2.3 to 4 knots an hour. The flood assumes a more northerly trend along the main shore. The direction of the ebb current is nearly opposite to that of the flood, and runs with equal velocity.

The currents in the Bay of Fundy are predominantly tidal in their character, running strongly during flood and ebb in the two directions which are usually opposite. Any veering, or set in a cross direction, occurs only at half tide. In the offing, the current shifts with the sun more in turning, and does not reverse its direction so quickly as it does nearer the shore.

From Cape Sable westward to the mouth of the Bay of Fundy, the time of slack water has a definite relation to the time of high or low water at St. John, New Brunswick.

In this region the moon's distance, as it varies from perigee to apogee, affects the strength of the currents quite as markedly as the change from springs to neaps with the moon's phases.

While the behavior of the current is very regular and constant at any definitely fixed point, it is especially to be noted that a change in position of only a few miles may make a marked difference in its character. This difference is chiefly in the velocity, and in the time of slack water, and not so much in the direction of the current.

When passing islands, the velocity of the current may be very different, according to the offing given; in channels and passages there may be a difference, between the center and the sides, of an hour in the time of slack water.

Almost everywhere the current is as strong down to a depth of 30 fathoms as it is on the surface, and at most places it turns in direction on the surface and below at practically the same time. This has an important bearing on wind disturbance, as it shows that the tidal current will soon regain its normal direction and velocity after a storm moderates.

There is no general movement of the water in any one direction in the entrance to the Bay of Fundy which is at all well marked, nor does its temperature give any indication of this.

After southwest gales the current at ebb is greater than at flood, but at a depth of 30 fathoms both currents run as usual. The fishermen state that in the vicinity of Yarmouth the winds do not affect the ebb, but the flood is accelerated by a south or southeast wind and retarded by a northwest wind.

General directions for navigation.—In approaching the southeast coast of Nova Scotia, and also the shores of the Bay of Fundy, it must be borne in mind that peculiar and distinctive features are not easily recognizable in the usual misty weather from distances at which it would be prudent for a vessel, uncertain of her position, to be kept from the land in consequence of the numerous outlying dangers.

The lighthouses, however, now erected along the coast afford great assistance to a stranger in ascertaining his position when first making the land.

Vessels bound to Nova Scotia or the Bay of Fundy usually cross the Great Bank of Newfoundland, unless a more southerly route is adopted with a view to the avoidance of ice during certain months of the year.

For vessels intending to pass to the northward of Sable Island, the Banquereau Bank is a good and safe guide, for by keeping, if possible, on the parallel of this bank, in depths of between 30 and 40 fathoms a vessel may, under ordinary circumstances, feel her way to the northward of Sable Island clear of danger.

Between Cape Canso and Halifax it is not advisable to approach the coast within the 40-fathom curve; but it must be borne in mind that this depth may be found within the distance of 3 miles of some of the most formidable dangers between Cape Canso and Halifax; as, for instance, Lockwood Rock, in the approach to Mary Joseph Harbor, where it is less than 1 mile distant.

Approaching Halifax Harbor from the westward, the bank of soundings off Sambro Island, terminating in a point, at the depth of 30 fathoms, 5 miles southward of the Sambro Ledges, offers considerable assistance to vessels in the thick fogs which so frequently prevail. From the eastward the approach is rendered comparatively easy by the absence of outlying dangers after passing Shut In Island,

and by the soundings deepening out with tolerable regularity to 30 fathoms, at distances varying from 4 to 6 miles from the coast; but when within 2 miles of Chebucto and White Heads, the depth of 30 fathoms will be found within 800 yards from the shore. Attention to these soundings, combined with the fog signal, from Sambro Island Lighthouse, the diaphone fog whistle on Chebucto Head, and the fog whistles on the automatic buoys, moored at the entrance of Halifax Harbor, may enable steamers to enter the harbor notwithstanding the fog, though it would be more prudent, especially in large vessels, to avoid attempting it under such circumstances.

In a passage from Bermuda to Halifax will be noticed the marked line of demarcation between the Gulf Stream and the Labrador Current, or "Cold Wall," on account of the sudden decrease in temperature of the sea water, at times amounting to 30° F. in the space of one hour. With northerly winds clear weather may be expected, but should the wind be from the southward, the probabilities are strongly in favor of a fog coming on soon after the cold wall is passed.

The coast in the vicinity of Halifax is of moderate height, the hills near the shore being seldom 200 feet above the sea. To the eastward of the harbor, as far as Jeddore, almost all the headlands present cliffs of reddish sand, clay, and bowlders to the wasting action of the waves, while to the westward, as far as Mars Head, granite rocks, nearly white, predominate. Hence when standing in for the land a stranger might know on which side of Halifax Harbor he is by the remarkable difference that exists in the color of the shores; red denotes being to the eastward and white to the westward of the entrance; this is especially to be remembered when making Halifax from the southward.

During a dark night or thick fog do not approach the Sambro Ledges within the 50-fathom curve, as a depth of 40 fathoms will be found ½ mile eastward and 1 mile southward of these dangers. The bottom in the approach to Halifax is very uneven, and soundings have not yet been obtained in sufficient detail to justify much confidence being placed in a position assumed from depths alone.

Bay of Fundy.—The Bay of Fundy is deep, but the usual difficulties attending navigation are much increased in it, as the mariner must expect to encounter frequent fogs of long duration, rapid and uncertain tides, and experience a difficulty in obtaining anchorage on account of the depth of water. These causes render the most unremitting attention necessary when frequenting this locality, in order to avoid the numerous dangers which mark the approaches to the bay.

The eastern side of the entrance to the Bay of Fundy is much encumbered by outlying dangers and the channel between the Northwest Ledges off Long Island and Old Proprietor Shoal off Grand Manan Island being about 17 miles.

Vessels bound to ports on the northern shore of the bay are recommended to use the channel westward of Grand Manan Island, which varies from 6 to 10 miles in breadth, rather than the passage on the eastern shore, for the coast of Manan is not only bold and without offlying dangers, but during the summer months the atmosphere is generally clear on the United States shore, while the coast of Nova Scotia and the greater part of the Bay of Fundy are enveloped in fog; it is also the most advantageous with the prevalent winds, which are from the westward.

The tidal current on Browns Bank, off Cape Sable, occasionally runs northeastward for 15 hours continuously at the rate of 2 knots an hour. The possibility of the occurrence of this deviation from the usual set of the tide should be taken into careful consideration when crossing or endeavoring to enter the Bay of Fundy, especially during thick or foggy weather.

Routes—Full powered steamers.—The rapidly increasing number of large steamers crossing the Atlantic and their high rates of speed has necessitated the adoption of clearly defined and separate routes to be followed by outward and homeward bound steamers. The routes as given hereafter have been reported to have been laid down and agreed to by the principal steamship companies (1913), and will be very generally followed by all the principal lines. It is much to be desired that they should be strictly followed by all vessels except those with only low power using a combination of sail and steam, the routes of which closely approximate to those of a sailing vessel. Masters of sailing vessels and of low powered steamers should make themselves acquainted with the full powered steamer routes, and, for their own safety, as well as that of the liners, keep well clear of them. Steamers by following these routes not only reduce to a minimum the danger of collision with each other or with ice (always one of the chief dangers of this navigation), but in case of a breakdown of machinery are almost certain of receiving timely assistance from other vessels following the same route.

TRANS-ATLANTIC OR "LANE ROUTES."

FROM FEBRUARY 1 TO AUGUST 31, BOTH DAYS INCLUSIVE.

Westbound.—From Fastnet or Bishop Rock on Great Circle to Long. 47° W. in Lat. 41° 30′ N., thence by either rhumb line or Great Circle to Boston Light Vessel, or a point south of Nantucket Shoals Light Vessel.

Eastbound.—From Lat. 40° 10′ N., Long. 70° W., or from Boston Light Vessel by rhumb line to Long. 47° W., in Lat. 40° 30′ N., thence by Great Circle to Fastnet or Bishop Rock.

FROM SEPTEMBER 1 TO JANUARY 31, BOTH DAYS INCLUSIVE.

Westbound.—From Fastnet or Bishop Rock on Great Circle to Long. 50° W. in Lat. 44° N., thence by either rhumb line or Great Circle to Boston Light Vessel, or a point south of Nantucket Shoals Light Vessel.

Eastbound.—From Lat. 40° 10′ N., Long. 70° W., or from Boston Light Vessel by rhumb line to Long. 50° W. in Lat. 43° N., thence by Great Circle to Fastnet or Bishop Rock.

Halifax to England.—From February 15 to April 10, inclusive: Proceed by rhumb line to Lat. 43° N., Long. 47° W., thence by the Great Circle course to Fastnet, Inishtrahull, or Bishop Rock.

From April 11 to May 15 and November 15 to February 14, inclusive: Proceed by rhumb line to Lat. 45° 30′ N., Long. 50° W., and from there by Great Circle course to Fastnet, Inishtrahull, or 10 miles south of the Bishop Rock.

From May 16 to the opening of the Belle Isle Strait route: Proceed by rhumb line to Cape Race, and from there by Great Circle course to Fastnet, Inishtrahull, or 10 miles south of the Bishop Rock.

England to Halifax.—From April 11 to May 15 and November 15 to February 14, inclusive: From Fastnet, Inishtrahull, or 10 miles south of the Bishop Rock, follow the Great Circle course to cross the meridian of 50° W. in Lat. 46° N., thence by rhumb line to Halifax.

From May 16 to the opening of the Belle Isle Strait route: Proceed by Great Circle course from Fastnet, Inishtrahull, or 10 miles south of the Bishop Rock, to Cape Race, thence by rhumb line course to Halifax.

From February 15 to April 10, inclusive: From Fastnet, Inishtrahull, or 10 miles south of the Bishop Rock, keep the Great Circle course to cross the meridian of 47° W. in Lat. 42° N., thence the rhumb line course to Halifax.

Special tracks westbound or eastbound will be agreed upon by telegraphic communication between the companies when varying circumstances, owing to abnormal conditions, may make such special tracks advisable.

The commanders of these vessels have permission, however, on encountering ice, to deviate from these tracks both when outward and homeward bound.

Vessels following these routes between Europe and the ports of the United States and British America are liable to encounter icebergs or extensive fields of compact ice.

Auxiliary steamers and sailing vessels—Northern route.—Vessels taking the northern route, which should only be attempted during the summer and autumn, should stand to the northwest crossing the meridian of 30° W. in Lat. 55° N., then steer gradually to the southwestward and endeavor to enter on the Newfoundland Banks in about Lat. 47° 30′ N., passing Cape Race at a convenient distance, when a course can be shaped for the entrance of Halifax Harbor, or wherever bound.

Sable Island should be given a wide berth, as it is a very dangerous locality owing to the prevalent fogs and variable currents near it. The lead should never be neglected in crossing the banks, and when once soundings have been struck its use should not be relaxed, whether bound for a Canadian or a United States port. In thick weather the thermometer is also a useful guide in approaching the Banks of Newfoundland, as the temperature of the water falls on nearing them.

In this route, although heavy weather is frequently experienced, the winds are generally more favorable, and the Labrador Current assists in the latter part of the voyage.

Vessels leaving the Thames or any of the ports on the eastern coast of the British Isles with a westerly wind will often find it advantageous, more especially in the summer, to go northward round the Orkneys rather than to beat down channel, and very often make quick passages by doing so. Vessels from Liverpool or the Clyde would probably gain time by going by the northern route passing out northward of Ireland.

Vessels bound for the Gulf of St. Lawrence or Halifax either endeavor to make Cape Race by passing northward of the Virgin Rocks or, in order to avoid the ice, cross the banks on the parallel of 44° N., hauling up on their proper course on reaching Long. 55° W., heavy ice being seldom met with westward of that meridian.

Southern route.—Sailing vessels, or steamers with small power, leaving the English or St. George Channel and bound for Halifax, after making the necessary westing to insure not being set into the Bay of Biscay, should shape a course for Madeira, which may be passed at any convenient distance on either side, except during the months of November, December, and January, and when it is preferable to pass to the westward of it, on account of the strong westerly gales which prevail, producing eddy winds and heavy squalls on the eastern side of the island.

After passing Madeira steer to the southwestward until within the northern limit of the northeast trade wind (which will be entered when the sun is near the northern tropic, between the parallels of 31° and 32° N., and when near the southern, between 30° and 31° N.), when the course should be altered gradually to the westward, keeping within the limit of the trade wind.

Cross the meridian of 40° W. in Lat. 26° N., which parallel should be preserved until the meridian of 48° W. be reached, when a more northerly course should be pursued, passing about 200 miles to the eastward of Bermuda; from there a course may be steered for Halifax, observing that in crossing the Gulf Stream when between the parallels of 38° and 42° N. the current will be found to set about east-northeastward with a velocity of 20 to 70 miles a day, attaining its greatest velocity when the sun is far to the northward. The color of the Gulf Stream water is a deep indigo blue, and the junction with ordinary sea water distinctly marked. On crossing the northern limit of the stream the temperature has been observed to decrease 30° F.

Halifax, to and from Bermuda—Full and low power routes.—Distance direct 740 miles.

Sailing route.—With a fair wind, direct, allowing for set of Gulf Stream. With a foul wind, take advantage of the Arctic current or Labrador (cold wall) to get to windward. In the winter keep to the westward of the direct route on account of prevalence of southwesterly gales.

Halifax, to and from West Indies—Full power route to West Indies.—Direct as possible vessels bound to Habana or the Gulf of Mexico, passing through Florida Strait; those for Port Royal or Colon passing through Crooked Island Pass and the Windward Channel. The distances are: To Habana, 1,614 miles; Port Royal, 1,810 miles; Colon, 2,317 miles; St. Thomas, 1,595 miles; Barbados, 1,900 miles.

Sailing route—To Barbados.—Cross the meridian of 60° W., or 56° W. Long. to the eastward, according to the time of year in about Lat. 27° N., then steer to the southward, allowing for a lee current.

To Jamaica.—Enter the tropic in about Long. 62° W. From there direct through Turks Island or Mona Passages.

To Nassau.—Pass through the northeast Providence Channel.

Low power route—To Barbados.—As in the sailing route, but using steam when necessary.

To Jamaica.—Direct to, and through, Crooked Island Pass and the Windward Channel.

To Habana and Gulf of Mexico.—Through Northwest Providence Channel, the Florida Strait, along the coast of Florida, from there across the Gulf Stream to the Cuban Coast.

To Halifax—Full power route.—Direct as possible. Vessels from the Gulf of Mexico by Florida Strait, those from Colon or Jamaica by Windward Channel and Crooked Island Pass.

Sail and low power route.—From Barbados.—To windward of all the islands. From the other islands pass close to the leeward of Antigua.

From Jamaica.—Through the Florida Strait, or the Windward Passage, according to season, but low-powered vessels should always use the latter. When through it, pass through Crooked Island, Mariouana, or Caicos passages, after which stand to the northward out of the trade wind and then direct for Halifax.

Halifax, to and from St. Johns, Newfoundland—Sail or steam.—Direct distance, 530 miles. Pay great attention to the soundings, and beware of indraft to the northwestward off the coast of Newfoundland, as fogs usually prevail.

Halifax, to and from Gibraltar—To Gibraltar—All vessels.—The rhumb line should be followed in preference to the Great Circle, as it leads clearer of the ice. Distance, 2,710 miles.

From Gibraltar—Full power route.—Keep on, or just to the southward of the parallel of Gibraltar until in about 45° W. From there direct. Distance, 2,920 miles.

Low power and sailing route.—Steam must be used to clear the Strait of Gibraltar. From there stand to the southwestward into the northeast trade wind, run to the westward to Long. 48° W. From this position pass about 200 miles eastward of Bermuda and then direct to Halifax.

It is essential to the safety of vessels to attend to indications of a coming fog, for to the neglect of the precaution of freely using the deep-sea lead, no less than to the fogs and irregular currents, the shipwrecks on Sable Island and the southeastern coast of Nova Scotia are attributable.

All this portion of the sea from the eastern limit of the bank of Newfoundland past Cape Race to Halifax, as well as to Portland, Boston, or other harbors of the coast of the United States, is within soundings, and therefore during foggy weather or when in doubt respecting the vessel's position frequent soundings are absolutely necessary.

Rapid change of variation.—Another important point to which due attention should be paid is that in approaching the coast of Nova Scotia the variation of the compass changes rapidly, and if not allowed for might easily run a vessel into danger.

The deviation of the compass needle is a subject of special importance in approaching and navigating the entrance of the Gulf of St. Lawrence, and no opportunity should be lost of ascertaining its amount. The low horizontal force and high dip cause a maximum amount of change in compasses that have been corrected in other places, as, for instance, in England or ports of the United States, and this change may be considerable in compasses unfavorably placed or improperly corrected.

This decrease in the horizontal magnetic force tends to make the compass at its best sluggish in action and shows the necessity for taking care that no mechanical defects, such as worn caps and pivots, exist in the compass employed.

Uniform system of buoyage.—Throughout the Dominion of Canada the channels and passages, etc., are marked according to the following system:

Starboard hand buoys.—Approaching from seaward all buoys on the starboard side of the channel are painted red, and, if numbered, marked with even numbers, and must be left on the starboard hand.

Conical buoys when used are always starboard hand buoys. Topmarks are conical.

Starboard hand spar buoys have pointed tops.

Port hand buoys.—Approaching from seaward all buoys on the port side are painted black, with odd numbers, if any, and must be left on the port hand. Topmarks are cylindrical.

Port hand spar buoys have flat tops.

Middle-ground buoys.—Buoys painted red and black in horizontal bands mark obstructions or middle grounds and may be left on either hand.

Buoys painted white and black in vertical stripes mark mid-channel and must be passed close to to avoid danger.

Topmarks.—All other distinguishing marks to buoys are in addition to the foregoing and indicate particular spots, a detailed description of which is given when the mark is first established.

Perches with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on which hand they are to be left.

The rule for coloring buoys is equally applicable to beacons and other day marks, so far as it may be practicable to carry it out, but the shapes with the exception given above have at present no special significance.

Buoyage in general.—In the Dominion of Canada the buoys are as a rule maintained in position during the season of navigation. In districts where the lights are maintained in operation throughout the year the buoys are always kept in position; in districts where navigation is closed in winter the buoys are kept out in the autumn until the last vessels have cleared or as late as the ice will allow with due regard to their safety. They are replaced in the spring as soon as the state of the ice will permit.

Winter buoyage.—All buoys in the Bay of Fundy, as far eastward as Quaco, and all buoys on the Atlantic Coast westward of Halifax, are left out all the year round; in the Bay of Fundy, eastward of Quaco, buoys are lifted about December 10 and replaced about April 15; on other parts of the coasts they are left out as long and replaced as soon as ice conditions allow, harbor buoys being the earliest removed.

In Lubec Narrows and on the United States side of Passamaquoddy Bay all the buoys northward of the Middle Ground Buoy in Lubec Narrows are taken up during the winter.

Harbor buoys.—All can and conical harbor buoys eastward of Halifax are withdrawn every year during the autumn. Westward of Halifax they remain in position all the year round.

Spar buoys.—In all the principal harbors spar buoys are kept out as long as the conditions of the ice allow both eastward and westward of Halifax.

Buoys substituted.—The following buoys are replaced by spar buoys during the winter: S. W. Bull, White Head, bell buoy; New Harbor Head, whistle buoy; Southeaster Rock, can buoy; Bull Rock, Fisherman Harbor, bell buoy; Liscomb Shoal, bell buoy; Macherel Shoal, conical buoy; Thorn Ledge, Jeddore, can buoy; Bar Reef, conical buoy.

Uniform system of lights for gas buoys and beacons.—It is the intention of the Department of Marine of Canada to establish a uniform system for the characteristics of lights of gas-lighted buoys and beacons, the lights on the buoys or beacons which are to be left on the starboard hand in going up stream being red and those to be left on the port hand white; that is to say, red buoys and beacons will carry red lights and black buoys and beacons white lights.

For special positions, such as middle grounds, fairways, etc., special arrangements will be made. White lights, will, however, be favored when possible.

Mariners must bear in mind the fact that gas buoys are unwatched, and if extinguished, some time may elapse before a tender can reach them to repair or relight. Their lights can not therefore be depended upon in the same way as those shown from watched lighthouses.

Buoys marking outlying dangers, owing to their exposed positions, are always liable to break adrift or to other accident; therefore implicit reliance should not be placed on their being in position.

Note.—For detail description of lights, fog signals, and lighted buoys, see Light List.

Wreck markers.—Buoys and the top sides of vessels used for marking the position of wrecks are painted green with a white inscription, and moored, when possible, near the side of the wreck next to midchannel.

The following are exhibited from wreck-marking vessels:

By day.—Three balls from a yard, 20 feet above the sea; two placed vertically on the side that shipping may safely pass and one on the other side.

By night.—Three fixed white lights arranged similarly to the day balls, but the light is not shown.

Mariners will therefore know on sighting a wreck marking vessel that she is thus employed, and they should pass on that side of her on which the two balls or two lights are shown.

SUBMARINE FOG SIGNALS—DESCRIPTION.

There are a number of bells in use, including stations, light vessels, and buoys, in Canadian waters. Each submarine station contains an engine, which furnishes power for ringing the bell attached to a tripod placed in water deep enough to allow a deep draft vessel to pass over without contact. An electric bell is used in deep-sea generation of sound. The cable at some stations is often several miles in length, reaching from the tripod to the shore. This cable is about 1¼ inches in diameter and contains four copper conductors, which are covered with rubber insulation and are held together by a covering of jute and steel armor wire. Two of the conductors supply current for ringing the bell and two are telephone wires.

The power sending apparatus now in use are electric, pneumatic, automatic, and hand apparatus.

On light vessels anchored many miles from shore pneumatic mechanism rings a bell hung from a davit over the side of the vessel. Rubber twin hose and piping connect the bell with the air supply on board, compressed by steam from the boiler of the light vessel. The bell is lowered to a depth of 25 feet and is raised and lowered by a windlass. The bell mechanism and case together weigh about 450 pounds and measure over all 15½ inches in diameter by 39 inches in height.

The submarine bell buoy may be either a lighted or an unlighted one, but any ordinary can or conical buoy of sufficient size and buoyancy to support the actuating mechanism has been found satisfactory. The bell is rung automatically by the rise and fall of the buoy, caused by the motion of the water. Even in comparatively smooth water the buoy has enough energy to produce sound.

At land stations and on light vessels a code has been arranged to enable the officers of a vessel supplied with the code to ascertain the latitude and longitude of their vessel when observations for this purpose have been impossible. An attachment called the code ringer forms part of the apparatus, and the value of the code has in several instances of casualties to liners been proved by enabling a vessel in distress with equipment to communicate to other vessels with radio apparatus its exact position.

Without the receiving apparatus on board a vessel the submarine warning bell would be of no value. The refraction of sound waves is utilized by means of the receiver, which is fastened well forward of a vessel and under the water line.

These receivers contain telephone apparatus, dry batteries for supplying an electric current for the telephone, microphones for transmitting the bell sounds to the telephones, tanks to contain the water in which the microphones are immersed, junction boxes and conduits holding electric cables for connecting the indicator box; also switches for connecting alternately the receivers on the sides of the vessel.

One important feature in connection with the practical use of the receivers is the facility with which an officer in approaching a station or buoy can determine upon which side of his vessel, in a fog or thick weather, the warning is located. Sounds emanating from the bell are heard more distinctly upon the side toward the station or buoy; but if no difference of sound is apparent between the two receivers, the officer may conclude that the bell is located directly ahead.

CHAPTER II.

BAY OF FUNDY—GRAND MANAN ISLAND AND THE NORTHWEST SHORE—WEST QUODDY HEAD TO CUMBERLAND BASIN, NEW BRUNSWICK, AND NOVA SCOTIA.

General remarks.—The Bay of Fundy is an extensive arm of the sea on the eastern coast of North America, separating the Province of New Brunswick from the southwestern part of Nova Scotia, and extending upward of 100 miles in a northeast by east direction with an average breadth of about 30 miles.

At the entrance of the bay are Grand Manan and smaller islets, as well as numerous dangers; on the northern side are Passamaquoddy and other bays and the harbor of St. John, a place of considerable commercial importance. The head of the bay is divided by a tongue of land into two branches, viz, Chignecto Bay on the north and Minas Basin (Basin of Mines) on the south.

The Bay of Fundy is deep, but the navigation is rendered not only difficult but dangerous by numerous off-lying dangers fringing the approaches, by rapid and uncertain tides, as well as by the frequent occurrence of dense fogs.

Grand Manan Island, triangular form, is about 13.5 miles in length in a northeasterly and southwesterly direction, with an extreme breadth of nearly 6 miles, is included in Charlotte County, in the Province of New Brunswick, and lies on the northwestern side of the entrance to the Bay of Fundy, about 5½ miles from West Quoddy head, Maine, the channel between being free from dangers. With its off-lying shoals, Grand Manan occupies nearly half the width of the entrance of the southern approach to the Bay of Fundy.

From the summit of the island the land slopes gradually to the eastward, where it is partially cleared and settled; but on the western side the shore terminates in steep cliffs, some of which are nearly 400 feet high. The northern end of the island is abrupt and steep-to, as is also the whole of the western coast, which can be approached within 200 yards, except in the immediate vicinity of Dark Harbor.

The island has a population of about 3,000.

From Southwest Head Lighthouse, the extreme dangers off Grand Manan Island, viz, Old Proprietor Reef to the southeast and Machia Seal Island to the southwest, are about 10½ miles distant; while the outer part of an intermediate cluster of dangers southward of the island known as Murr Ledges is 7½ miles. This extensive range of dangers, many of which never uncover, increases the difficulty and danger of navigation and renders extreme caution necessary.

Nevertheless, inside the shoals, and covered by the islands lying off the southern and eastern sides of the main island, are several harbors and sheltered anchorages.

During fogs with southerly and southwesterly winds it frequently happens that a clear space a full mile wide extends off the northern part of the island, a fact which should be borne in mind, as it may facilitate making a good landfall.

The soil of Grand Manan is generally good and the island is thickly wooded, producing every variety of fir, beech, birch, and maple in size and quality adequate to all purposes for which they are generally used. The eastern coasts abound with fish.

Local magnetic disturbance.—An area of local magnetic disturbance has been reported southward of Grand Manan Island.

The area is located ¾ mile southward of Three Islands and is about 150 yards in diameter, with a depth of 12 fathoms.

The greatest deflection of the compass observed was 45°.

Communication.—There are telegraph stations at Southwest Head, Seal Cove, Grand Harbor, Woodward Cove, and Swallow Tail.

Southwest Head Light, fixed and group flashing white, visible 20 miles, is exhibited 200 feet above high water from a white square lighthouse 43 feet high on Gull Cliff, the southwestern extremity of Grand Manan Island.

Southwest Head Whistle Buoy lies 125 yards 206° from the lighthouse.

Fog signal.—A hand foghorn is sounded at Southwest Head Lighthouse whenever the fog signals of vessels are heard (see Light List).

Seal Cove lies on the eastern side of the Southwest Head Promontory and is formed between that promontory and Big Wood Island; it is about 3 miles long and 1 mile wide, with depths of from 6 to 10 fathoms. The entrance is between Buck Rock and the shoals extending southwestward from Big Wood Island and ending in Green Island.

Green Island, only showing at low water, lies on the eastern side of the entrance, at the end of the shoals extending to the southwestward from Big Wood Island.

Shoal.—A rocky shoal 500 yards long in a north and south direction and 250 yards wide to the 3-fathom curve lies southward of

Grand Manan Island, between Green Islands and Big Wood Island, 1.3 miles 285° 30′ from the northern end of the Northern Green Island.

Little Wood Island life-saving station is established on Little Wood Island.

The boathouse, which stands on the northern side of the island, is a rectangular wooden building, painted brown. A motor surfboat is held ready for service in case of disaster to shipping.

The dwelling of the caretaker of the station is a rectangular wooden building, painted white, standing on the summit at the southwestern end of the island.

Buck Rock is a small rocky patch, 500 yards from the shore, with deep water all around, which uncovers at two-thirds ebb and generally breaks.

A black spar buoy is moored off Wilcox Point 720 yards 349° from Buck Rock.

Big Wood Rocks project 500 yards into the cove from the northwestern side of the island, with 5 fathoms close outside them; the inner rock generally dries, but the outer rock has 4 feet over it at low water.

There is a passage with 1¾ fathoms in it at low water between the northern end of Big Wood Island and the Manan shore, but it should not be taken by a stranger.

Anchorage.—There is good anchorage at the head of the cove, in 4 or 5 fathoms mud, or sheltered from easterly winds under the lee of Big Wood Island. With southerly gales a good deal of sea gets into Seal Cove. In running for the anchorage the Southwest Head may be rounded, if necessary, at the distance of 200 yards, and after passing Buck Rock the western shore may everywhere be approached to that distance.

Tides.—It is high water, full and change, at Seal Cove at 10h. 54m.; springs rise 20 feet, neaps 15 feet.

Grand Harbor, at the southeastern angle of Grand Manan, is sheltered by Ross Island; it has a least depth of 2¼ fathoms in the entrance until well within Fish Fluke Point; but the whole sheltered space of the harbor is dry at low water, and is therefore only adapted for small vessels which can lie aground. There is a good beaching place for vessels of 10 feet draft on the western side.

Fish Fluke Point Light, occulting white, elevated 40 feet above high water, visible 11 miles, is exhibited from a white square lighthouse, 32 feet in height, on the eastern side of Grand Harbor.

Fog signal.—A hand foghorn is sounded at the lighthouse whenever the fog signals of vessels are heard.

Tides.—It is high water, full and change, at 11h. 7m.; springs rise 21 feet, neaps 17½ feet.

Bell buoy.—A black bell buoy, with "Ox Head Ledges" in white letters, is moored off the entrance of Grand Harbor, at a distance of about 1 mile, and 1,600 yards 205° from Fish Fluke Lighthouse.

Gull Cove is a small anchorage on the eastern side of White Head Island, affording good shelter except when the wind is between north by east and southeast. A vessel should anchor about 300 yards from the shore in a depth of 5½ fathoms sand, northwestward of Gull Rock.

Gull Cove Light, fixed white, elevated 81 feet above high water, visible 14 miles, is exhibited from a white wooden square tower, 49 feet high, with sloping sides, situated at the head of Gull Cove.

A rock about 200 feet in diameter and with a depth of 7 feet has been reported about 0.9 mile 135° from Gull Cove Lighthouse, and is known locally as Halibut Rock.

Bell buoy.—A black bell buoy is moored in 6 fathoms 800 yards 68° from Prangle Point.

Big Duck Island Anchorage affords another shelter on the eastern side of Grand Manan, protected by Big Duck Island and Ledge. The best anchorage is in about 3½ fathoms mud, with the western tangent of Long Island midway between High and Low Duck islands, and the foghorn station on the southern point of Big Duck Island bearing 88°.

There is a depth of 9 to 10fathoms in the approach to this anchorage from the southward between Big Duck Ledge and White Head Island, but Big Duck Island is connected with the shore by a bar, over which there is probably not more than 2 fathoms water, so that no vessel should enter or leave by that passage except with a suitable rise of tide and good local knowledge.

Fog signal.—A foghorn, operated by compressed air, is situated near the southern end of Big Duck Island. The building is painted white, with a brown roof; a small white dwelling stands a short distance northwestward of it.

Big Duck Ledge is a prolongation of Big Duck Island to the southward for more than 1 mile; the highest part near the southern end never covers. The eastern side is steep-to, but the southern end should not be approached within ½ mile.

Buoy.—The southwestern extremity of Big Duck Ledge is marked by a red conical buoy, moored in 4½ fathoms, about 250 yards 155° from the ledge.

Woodward Cove, dry at low water, lies between Nantucket Island and the shore of Grand Manan.

Beacon.—A black beacon 27 feet high, consisting of a spindle surmounted by an iron cage, stands on Big Round Rock in the western part of the cove. Vessels intending to take the channel between the beacon and the bar on the north should give the beacon a berth of about 40 yards.

Long Island Bay, about 3 miles northward of Big Duck Island, is entered between Long Island and Swallow Tail Point; it affords good anchorage in its southern bight in a depth of about 3 fathoms, sand, sheltered from all except northerly winds. In approaching the anchorage care must be taken to avoid a rock awash at low-water springs 500 yards from the northern end of Long Island; when clear of this rock, haul to the southward and anchor with the eastern end of Farmer Ledge (always above water) in range with the center of High Duck Island and the northern extremity of Long Island bearing 29°.

North Head Harbor (Flag Cove), the northern bight of Long Island Bay, affords anchorage close inshore in about 5½ fathoms, stiff clay, protected from all winds except those between south by east and southeast. A reef of rocks which uncovers at last quarter ebb projects 400 yards from Flag Point; therefore in approaching this anchorage from the northward keep Swallow Tail Lighthouse bearing northward of 37° until Low Duck Island begins to open westward of Long Island; the vessel is then clear of this reef and may haul up for the anchorage.

There is a post-office, chapel, and other buildings in North Head Harbor, and Swallow Tail Lighthouse is a good guide to the entrance.

Buoy.—A red bell buoy with "Net Rock Ledges" in white letters on the deck is moored in 9 fathoms of water off the extremity of Net Rock Ledges off Flag Point.

Swallow Tail Light, occulting white, visible 18 miles, is exhibited 148 feet above high water from a white octagonal wooden building, 50 feet high, with white dwelling and outbuildings near, erected on Swallow Tail, near edge of high cliff, northeastern part of island.

Fog signal.—A fog bell, operated by machinery, is located on the southeastern extremity of Swallow Tail, about 450 feet southward of the lighthouse. The fog bell stands in front of a small rectangular wooden building. (See Light List.)

Whale Cove, near the northern end of Grand Manan, affords good temporary anchorage, sheltered against southerly winds, in a depth of about 5 fathoms, but it is entirely exposed to northeasterly winds.

Long Eddy Point—Fog signal.—On the beach at Long Eddy Point, the northern extremity of Grand Manan, is a rectangular wooden fog signal building, painted white, with a red roof, with the horn projecting from its northern side 16 feet above high water. The fog signal consists of a diaphone operated by compressed air. (See Light List.)

Dark Harbor.—On the northwestern side of Grand Manan, about 4 miles from Long Eddy Point, there is a remarkable inlet, with a depth of from 5 to 7 fathoms, across the mouth of which a shingle beach has formed, with only a small opening available for boats about two hours before high water, but reported since 1870 as being almost closed. There are sawmills at this place and a pier near the southern end of the basin.

Bradford Cove, the only anchorage on the western side of the island, is about 1.5 miles northward of Southwest Head Lighthouse. The anchorage is off a valley and a green bank, in a depth of from 8 to 10 fathoms, about 300 or 400 yards from the shore, and is sheltered from winds, northeast by north, through east and south, to southwest.

Grand Manan Bank, 15 miles southward of Machias Seal Island and about midway between the shores of Nova Scotia and Maine, is about 5.5 miles long in a northeast and southwest direction and half that width, with depths of from 24 to 47 fathoms, gravel and sand, or, according to some fishermen, as little as 10 to 15 fathoms on the shoalest part. Around the bank are depths of from 50 to 80 fathoms, mud and sand.

There are two other banks southward of this, of which one lies 2.5 miles from the southwestern extremity of Grand Manan Bank and is 5 miles long by 1 mile wide, with depths of from 28 to 48 fathoms; the other, about 6.7 miles from the same extremity, is 2.5 miles long by 2 miles wide and has from 36 to 50 fathoms upon it.

Obtaining soundings on these banks is very useful and gives confidence when running for the Bay of Fundy, especially in thick weather.

Tidal currents run northeast by north and southwest by south over Grand Manan Bank and attain a velocity of 1.5 knots at half tide when they are at their strength, at which time both currents cause tide rips of great extent. The flood sets to the northward, ebb to the southward.

Machias Seal Island, on which the lighthouse stands, is the larger of two islands, joined at low water by a rocky ledge; it is about ¼ mile long and 28 feet high and is the most off-lying of the dangers southwestward of Grand Manan. It is situated about 10.5 miles 236° from Southwest Head Lighthouse.

Machias Seal Island Light, flashing white, visible 14 miles, is exhibited 82 feet above high water from a white, octagonal reinforced concrete tower 60 feet high, with sloping sides, near the middle of the island.

Fog signal.—A diaphone fog signal is installed in a rectangular white wooden building, with a gable roof on the southeast shore 152° from the light. (See Light List.)

A small shoal, with only 2 fathoms water, lies about 700 yards 120° from the lighthouse, with deep water in the channel between it and the island. The shoal shows a rip during the strength of the tide and breaks in heavy weather. This shoal lies on line with the lighthouse and southeast shore.

Anchorage can be found in the eddy on the southeastern side of the island, and a pilot can generally be obtained here. The St. Andrews pilots generally cruise off these islands.

Tides.—High water, full and change, at Machias Seal Island is at 11 h. 5 m.; springs rise 18 feet, neaps 14¾ feet.

Southeast Shoal lies 1.3 miles 120° from Machias Seal Lighthouse, with only 1¼ fathoms water, breaks in heavy weather and shows a rip during strength of tide.

Southeast Ledge lies 5.7 miles 124° from the above lighthouse, with 5 fathoms water, makes a tide rip, and breaks during heavy weather. There is probably less than 5 fathoms on it, as the rock is very abrupt, and the lead may not have touched the highest part.

North Rock lies 2.3 miles 15° from the lighthouse; it is about 4 feet above high water, and of small extent. There is a good passage between the rock and Machias Seal Island.

North Shoal lies 1.7 miles 346° from the lighthouse, with 1¼ fathoms water, shows a tide rip and breaks in heavy weather.

Middle Shoal lies 5.2 miles 50° from the lighthouse; has 3 fathoms over it, with deep water close to. It shows a large tide rip, and breaks in heavy weather.

Murr Ledges lie southward of Grand Manan Island and consist of an extensive cluster of dangerous shoals, 7 miles in length, between Gannet Rock to the eastward and Bull Rock to the westward and about 3 miles broad from Wallace Ledge on the north and to St. Mary Ledge on the south.

Gannet Rock lies 13.8 miles 88° from Machias Seal Island and 7.5 miles 136° from Southwest Head Lighthouse. It is a small bare rock, about 15 feet above high water, with a landing place on its northern side.

The western side of the rock can be approached to within 100 yards, but the eastern side is rugged, and a detached rocky shoal, with only 2 fathoms water, lies 700 yards 122° from the lighthouse. Vessels should preserve an offing of at least ½ mile.

Best time for landing during rough weather is at low water.

Gannet Rock Light, group flashing white, visible 14 miles, is exhibited 90 feet above high water from an octagonal, wooden tower, black and white stripes, red circular metal lantern, concrete foundation, on Gannet Rock, southward of Grand Manan. (See Light List.)

Fog signal.—A diaphone operated by compressed air is installed in a rectangular wooden building painted white, with red roof, standing on the southern end of Gannet Rock, about 40 feet from the dwelling attached to the light tower.

The horn is elevated 37 feet above high water and projects from the southern side of the building in a 161° 30′ direction.

Should the fog signal become disabled, cotton powder bombs will be exploded at intervals of 10 minutes. If a vessel's fog signal is heard in dangerous proximity an additional shot will be immediately fired, and the firing will be continued at intervals of five minutes until the vessel has passed the station. (See Light List.)

Telephone cable.—A telephone line for the protection of shipping has been established by the Government of Canada between Gannet Rock Light Station, and the Government telegraph office at Seal Cove on the southern shore of Grand Manan Island.

There are telephones at Gannet Rock, Little Wood Island, Big Wood Island, and Seal Cove.

The telephone line consists of a cable from Gannet Rock to the southern side of Little Wood Island, a land line on Little Wood Island, a cable from the northern side of Little Wood Island to the southern side of Big Wood Island, a land line on Big Wood Island, and a cable from the northern end of Big Wood Island to Seal Cove.

Half-tide Rock, which lies 1,200 yards 258° from Gannet Rock Lighthouse, uncovers at half tide, but has depths of 5½ to 9 fathoms all round at the distance of 100 yards; there is a clear channel between it and Gannet Rock. In rough weather the rock breaks at high water.

St. Mary Ledge lies 2.8 miles 233° from Gannet Rock Lighthouse. It is the southernmost of the Murr ledges, only covers at high water springs, so that its position is almost always shown; the ledge may be approached to the distance of 200 yards.

Yellow Ledge is 3.3 miles 243° from Gannet Rock Lighthouse, is always uncovered, the largest rock being 10 feet above high water.

The ledge can be approached to the distance of 400 yards, except on the southeastern side, where a rock covered with only 4 feet lies in line with St. Mary Ledge about 500 yards from Yellow Ledge. This rock breaks at low water, with a moderate swell, and at all times in very heavy weather.

Cross Jack Ledge lies 2 miles 264° from Gannet Rock Lighthouse, is about 700 yards in extent, only covers at high water springs, but it should not be approached within 500 yards.

A small rocky patch, which just uncovers at low water springs and breaks in heavy weather, lies 1,400 yards 207° from Cross Jack Ledge.

Long Ledge, nearly 1,400 yards in length, lies to the northward of Yellow Ledge, and has two points which are about 2 feet above high water springs. The point at the northern extremity of the ledge lies about 3.3 miles 274° from Gannet Rock Lighthouse. Between Long and Yellow ledges there is an extensive cluster of dangers, almost connected with the former ledge, leaving a clear channel, 800 yards wide, between Yellow Ledge and the southern rock of the cluster, which shows at first quarter ebb.

West Ledge lies about 4 miles 276° from Gannet Rock Lighthouse. The northern end is just awash at high water springs and has deep water all around. There is a clear channel about 1,300 yards across between West Ledge and the northern end of Long Ledge.

Wallace Ledge, of small extent, lies about 1,800 yards 356° from the highest part of West Ledge, uncovers at half ebb, and in bad weather breaks at high water. It may be approached in any direction to within a distance of 200 yards.

Kent Shoal lies about 2 miles 12° from Gannet Rock Lighthouse, and therefore in mid-channel of the passage northward of the Murr Ledges. Although fishermen have reported as little as 2 fathoms on it, nothing less than 3½ fathoms at low water could be found on its examination.

Patches of 4¾ and 4½ fathoms are charted, respectively, 500 yards 94° and about 1,500 yards 196° from Kent Shoal, the latter patch lying 1.1 miles 10° from Gannet Rock Lighthouse.

Bull Rock is of small extent, with 2 feet on it and deep water all around to within 500 yards, lies nearly midway between Gannet and Machias Seal Island lighthouses, the latter being about 6.7 miles 270°. Bull Rock shows a small rip during the strength of the tide and generally breaks. There is a rocky patch, with 7 fathoms on it, about midway between Bull Rock and Machias Sea Island.

Caution.—The soundings around Machias Seal Island and Murr ledges are irregular, and in approaching from the southward are very deep until close up to the rocks.

The principal shoals in the vicinity have been described, and it will be prudent for strangers to keep outside of all these dangers on account of the strong tidal currents. Should it be necessary a vessel may anchor between Murr Ledges and Grand Manan Island, in depths of from 10 to 20 fathoms.

Old Proprietor Shoal, about 4 miles 102° from the southern point of Three Islands and 5.6 miles 64° from Gannet Rock Lighthouse, uncovers at half tide, and is the most off-lying of the dangers southeastward of Grand Manan.

Clearing marks.—The southwest head of Grand Manan Island seen open southward of Three Islands, bearing 287°, clears all dangers to the southward; and Big Duck Island open eastward of Black Rocks, bearing 346°, leads eastward of Old Proprietor Shoal and all the dangers in its vicinity. Strangers should carefully avoid getting within the above leading marks.

Beacon.—On Old Proprietor Shoal is an iron spindle beacon, painted red, surmounted by a cage 31 feet above high water. It is visible 8 to 10 miles.

Light and whistling buoy.—A black cylindrical light and whistling buoy, with "Old Proprietor" in white letters, showing an occulting white light, is moored in 35 fathoms of water about 1,750 yards 164° from Old Proprietor Shoal Beacon. (See Light List.)

Foul Ground, to the westward of Old Proprietor Shoal, is an irregular shoal, about ¾ mile long from north to south; on its northern end a rock, which lies ½ mile 302° from Old Proprietor Shoal, is just awash at low water springs.

Rans Shoal lies 4.7 miles 46° from Gannet Rock Lighthouse, is small and rocky, with only 1½ fathoms water on its shoalest part. The southern point of Three Islands bears 273° from the shoal.

Clearing marks.—The chimney of Cheneys House (the only house on the largest of the Three Islands) in range with the highest part of a ledge which never covers, bearing 300°, leads southward; and Mark Hill on Grand Manan Island, open westward of Green Islands, 324°, leads westward of Rans Shoal.

Crawley Shoal may be considered to be a continuation of the Foul Ground in a northerly direction for ½ mile. The shoalest part has a depth of 3 fathoms, and from it the higher of the two Black Rocks bears 5°, 2.7 miles, and the eastern side of Big Duck Island is seen just open to the eastward of Prangle Point and over the low part of Gull Rock.

Outer and Inner Diamond are rocky shoals, the highest parts of which are just dry at low water springs, bearing from each other 355° and 175°, nearly ½ mile apart. Outer Diamond is 2.8 miles 77° from the southern point of Three Islands and 2.5 miles 203° from the higher Black Rock.

A small 3-fathom patch, apparently steep-to, lies 600 yards 12° from the highest part of Inner Diamond Rock.

Clearing mark.—The chimney of the house on the northernmost of Three Islands, just open northward of the northern point of the easternmost of those islands, bearing 277°, leads northward of Inner Diamond and midway between it and Tinker Shoal and off the 3-fathom patch just mentioned.

Tinker Shoal lies 1.2 miles 181° from Long Point, White Head Island, is about ¼ mile in length, and the highest part uncovers at low water, except at very small neaps.

Clearing marks.—The southwest head of Grand Manan Island open to the northward of Three Islands, bearing 268°, leads northward of the shoal and Mark Hill, open southward of Pumpkin Island, which should be equidistant between it and White Head Island, bearing 311°, leads between Tinker and Brazil shoals and clears all dangers to the northward.

Brazil Shoal is an extensive danger; the southwestern end, situated 1 mile 139° from Long Point, uncovers at the last quarter ebb, and its northeastern end, ½ mile distant, just shows above low water, spring tides; between these two patches the bottom is very irregular.

Bell buoy.—A bell buoy painted black and white in vertical stripes has been moored southward of Brazil Shoal.

Clearing mark.—Mark Hill, 311°, open southward of Pumpkin Island, which should be equidistant between it and White Head Island, leads between the Tinker and Brazil shoals and clears all dangers to the northward.

White Head Ledge—Buoys.—White Head Ledge, about 1.4 miles northwestward of Long Point, White Head Island, is marked on its southern side by a red conical buoy marked "W.H.L." in white, moored in 9 fathoms water about 400 yards southwestward of the ledge.

A black can buoy is moored in 3½ fathoms on the eastern side of White Head Ledge, about 300 yards eastward of the rock awash at low water on the ledge.

A red conical buoy is moored in 3½ fathoms on the western side of the ledge about 600 yards west-northwestward of the rock awash at low water on the ledge.

Black Rocks lie 1.5 miles 82° from Long Point; they are two rocks 200 yards apart, bearing from each other, 37° and 217°. The larger and northeastern rock is about 10 feet above high water, and the smaller rock 4 feet; they can be safely approached on either side to 200 yards. These rocks are situated about ¾ mile southeastward of the middle part of White Head Island.

Bulk Head Rip lies 1.5 miles northward of Clarks Ground and extends about 2.5 miles in a southeasterly direction from Black Rocks. The rip is caused by the change in depths over the uneven rocky bottom, though there is plenty of water through it.

Clarks Ground lies 2 miles 43° from Old Proprietor Shoal Beacon; it has 6 fathoms least water on it, and also shows a heavy tidal rip on the ebb.

Tidal currents.—The flood current sets to the northward, the ebb to the southward, on each side of Grand Manan Island, running parallel with the coast at from 2 to 3 knots on the eastern side and fully 3 knots on the western side, near the shore. Through the islands and reefs off the southern end of Grand Manan the flood has a general northeasterly and the ebb a general southwesterly direction, both currents, however, diverging considerably from these general directions in places owing to the obstructions met with.

About Gannet Rock the flood sets east by north and the ebb west by south from 3 to 4 knots an hour. Near Machias Seal Island the tidal current sets north by east and south by west, with a velocity of about 3 knots.

Through the dangerous reefs between White Head Island and Old Proprietor Shoal the tidal currents run at a velocity of 4 to 6 knots, causing heavy tide rips, which give the surface of the sea a boiling appearance and render the dangers indistinct; strangers are, therefore, strongly recommended to keep well outside the clearing marks for Old Proprietor Shoal. In the vicinity of Old Proprietor Shoal the current turns about three-quarters of an hour before high and low water by the shore.

Directions.—Approaching Grand Manan from the eastward or southeastward, and bound by the inshore channel either to Seal Cove or round Southwest Head, bring the latter open southward of Three Islands, bearing 287°, to clear Old Proprietor Shoals (passing to the southward of the light and whistle buoy marking Old Proprietor Shoals); thence pass Three Islands at a distance of 500 or 600 yards and proceed for Seal Cove or to round the head, as may be required.

If bound for Grand Harbor, after having passed Old Proprietor Shoal, Mark Hill, open westward of Green Islands, 324°, leads past Rans Shoal and up to the above islands, but the harbor should not be attempted without a pilot. A temporary anchorage may, however, be taken about 500 yards from the northeastern shore of Three Islands, in about 5 fathoms, sand, sheltered from all westerly winds.

Approaching from the southward, keep Big Duck Island open eastward of Black Rocks, 344°, in order to pass eastward of Old Proprietor, and after passing Black Rocks at a moderate distance bring the western tangent of Long Island midway between High Duck and Low Duck islands, 338°, which will lead about 400 yards outside the bell buoy marking the rocks off Prangle Point. Then haul in westward and proceed for the anchorage with the eastern points of Long and Low Duck islands in line and anchor with the western tangent of Long Island midway between High Duck and Low Duck islands and the southern point of Big Duck Island bearing 88°.

Grand Manan Channel is the passage between Grand Manan Island and the coast of Maine, varies in width from 10 miles at its southwestern end to about 5.5 miles at the northeastern end. In all respects it is the safest passage up the Bay of Fundy, as it is entirely free from dangers except those already described in the southern approach in the vicinity of Machias Seal Island, the nearest of which is North Shoal, 7.5 miles from the coast of Maine. The depths are from 45 to 55 fathoms in midchannel, with 30 to 40 fathoms within 1 mile of either shore. Vessels bound up the Bay of Fundy from the westward prefer the Grand Manan Channel to that southeastward of the island, not only on account of its freedom from shoals but it is less liable to fogs, which occur less frequently in this channel than in that to the southeastward of Grand Manan Island, the coast of Maine frequently being quite clear when the Nova Scotian side and the greater part of the Bay of Fundy are enveloped in fog.

The tidal currents set fairly through Grand Manan Channel at 2.5 to 3 knots and turn with high and low water. Near West Quoddy Head the flood current turns inward through Quoddy Road.

The Wolves, southwestern end, 8.5 miles 15° from the northern point of Grand Manan Island, consist of five thickly wooded islands, from 50 to 110 feet in height, and occupy a space about 3.3 miles in length.

Temporary anchorage in 12 to 20 fathoms may be obtained along the shores, which are steep-to.

The passage between East Wolf, the largest of the group, and Green Wolf has a depth of 6 to 12 fathoms, and is about 500 yards wide between the 5-fathom curve; vessels using this channel should keep well over to the Green Wolf side in order to avoid some rocks which extend about 600 yards off the southwestern shore of East Wolf. The passage between Green Wolf and Flat Wolf is narrowed to 200 yards by some rocks off the latter island, and should not therefore be taken; the passage to the southward of Flat Wolf and that between Spur Wolf and Southwest Wolf are not navigable except for boats.

None of the channels between these islands should be attempted by strangers, unless under unavoidable circumstances.

During thick weather, or with light winds and an adverse tide, vessels may anchor between the Wolves and Beaver Harbor in depths of from 20 to 25 fathoms, good holding ground.

Light and whistle buoy.—A cylindrical light and whistle buoy, painted black and white in vertical stripes, with "Wolves" in black and white letters and showing an occulting white light, is moored in 26 fathoms, 1.5 miles 341° from East Wolf Island.

Wolf Island Light, flashing white, visible 16 miles, is exhibited 111 feet above high water, from a lantern surmounting a white square wooden dwelling near the southern end of South Wolf Island.

Fog signal.—A fog hand horn is sounded at the lighthouse whenever the fog signals of vessels in the vicinity are heard. (See Light List.)

Whistle buoy.—A black whistle buoy with "S. Wolf" in white letters on it, is moored in 52 fathoms southward of The Wolves, 1.5 miles 140° from Southwest Wolf Lighthouse.

Wolf Rock, of small extent, and always above water, lies about 400 yards from the northern point of East Wolf, and is separated from another small rock to the eastward by a deep channel 200 yards wide. Both rocks should always be passed on their northern side and not within a distance of 400 yards.

Current.—A current has been observed, with both the flood and ebb, to set strongly from the center of Mace Bay toward The Wolves.

WEST SIDE GRAND MANAN CHANNEL.

Little River, on the western side of Grand Manan Channel and entrance to the Bay of Fundy, is about 12.5 miles 285° from Southwest Head, Grand Manan. It is an excellent harbor of refuge, sheltered from all winds, and is much used by fishermen and coasters. The entrance is about 200 yards wide between Eastern Knubble on the north, a high, precipitous, rocky point with a few trees on it, and Little River Island, which is connected with the southern shore by a shoal neck, the greater part dry at low water.

In coming from the southwestward the entrance is hidden by Little River Head, but this head may be known by several large white patches painted on the bare spaces of its rocky face. The harbor is 1.5 miles long within Little River Island, the upper part drying; it is unobstructed by ice even in the severest winters and is accessible at all times by both steamers and sailing vessels.

There is a depth of 6 fathoms in the entrance to Little River Harbor, decreasing to 5 fathoms at a distance of 800 yards inside, and to less than 2 fathoms at 1,600 yards; from thence it shoals gradually to the head of the harbor where it narrows and then dries.

The village of Cutler, at the head of the harbor, is a rendezvous for pilots for ports to the eastward and the Canadian Provinces and for United States ports.

Anchorage.—The best anchorage is just above the island in a space ½ mile long by ¼ mile wide, in a depth of from 2 to 5 fathoms, good holding ground; many small craft run higher up, some preferring to ground at the head. The harbor can be safely entered without a pilot, the only precaution necessary, if from the southward, being to keep well eastward of Little River Island until the channel, northward of it, is open, then run in on a mid-channel course and anchor as described.

Buoy.—A red spar buoy is moored in 4 fathoms of water to mark a shoal extending from the northern shore just inside Little River Island. With this exception the harbor is free from danger.

Little River Light, fixed and flashing white, elevated 57 feet above high water, visible 13 miles, is exhibited from a white conical iron tower 35 feet high, with a dwelling attached, erected on Little River Island.

Fog signal.—A fog bell, worked by machinery, is sounded. The building is a pyramidal shaped tower, situated 50 yards east-southeastward from the lighthouse. (See Light List.)

A red whistling buoy is moored in about 40 fathoms, off the entrance to Little River, 1 mile 105° from the lighthouse.

Coast.—From Little River Head the coast of Maine has a general northeasterly direction for 14.5 miles to West Quoddy Head, and is for the most part high, rocky, precipitous, and thickly wooded. It is steep-to, and may be safely approached anywhere to ½ mile, and in most places to half that distance, the only dangers being a 2-fathom patch within 400 yards of the shore 205° from Long Point, near Little River entrance, and Morton Ledge.

The few coves and harbors along this stretch of coast are badly obstructed by ledges and are exposed to all winds except those from the northward. The largest of these coves are Moose Cove and Baileys Mistake, respectively 7.5 and 5.5 miles southwestward from West Quoddy Head, but neither of these can be recommended even as a temporary anchorage.

Mortons Ledge, with 1 fathom over it and deep water all around at a distance of 200 yards, lies about 750 yards off shore, 2.3 miles 228° from West Quoddy Head Lighthouse.

A red conical buoy is moored in 48 feet of water, about 100 feet from the ledge, and should be given a berth of ¼ mile.

West Quoddy Head, in the State of Maine, is the eastern extremity of the United States coast; it is a small rocky peninsula rising to a height of 186 feet, its summit covered with fir trees, the lighthouse keeper's dwelling being at its eastern extremity.

West Quoddy Head Light, fixed white, elevated 83 feet above high water, visible 15 miles, is exhibited from a cylindrical lighthouse, painted in red and white horizontal bands, 42 feet in height, standing near the eastern extremity of West Quoddy Head.

Fog signal.—During thick or foggy weather a steam whistle is sounded. A bell will be rung if the steam whistle is disabled. The signal house is of white brick, 80 feet southwestward of the lighthouse. (See Light List.)

Lifeboat.—There is a lifeboat station at West Quoddy Head, and a life-saving station in Carrying Place Cove, the little bight to the westward of Mount Porcupine.

Tides.—It is high water, full and change, at West Quoddy Head, at 11h. 12m.; springs rise 21 feet, neaps 17 feet.

Sail Rocks are two small rocks above water, near the outer end of a reef extending 500 yards southeastward from West Quoddy Head Lighthouse. A heavy race extends to the eastward sometimes as far as from 1,000 to 1,400 yards from the rocks.

Whistle buoy.—A large black whistle buoy, marked "No. 1, W. Q. H." in white, is moored in 25 fathoms, 700 yards from Sail Rock in range with the lighthouse.

Passamaquoddy Bay.—From West Quoddy Head the United States coast, though much indented, trends generally northward, forming the western side of Passamaquoddy Bay, an extensive inlet about 10 miles in length in a north-northeast and south-southwest direction, which is common to New Brunswick and the State of Maine. On the western side of the bay is the St. Croix River, being the natural boundary between Canada and the United States.

The bay, which is never closed by ice, affords excellent shelter with a sufficient depth of water for vessels of any draft, while it swarms with fish, comprising herring, cod, and mackerel.

Boundary line.—The boundary line between United States and Canada and waters runs through West Quoddy Road and Lubeck Narrows, then midway through Friar Road and the main channel between Moose and Deer Islands, and thence parallel with the coast up the St. Croix River. The navigable waters of Passamaquoddy Bay are common to both parties for all lawful and direct communication with their own territories and foreign parts.

Certain buoys are placed to roughly indicate the boundary between the territorial waters.

Channels.—Across the entrance of the bay, about 10 miles wide, are numerous islands, rocks, and shoals, between which are three principal channels, the Southern, Ship Channel, and Letite Passage.

Ship Channel or **Head Harbor Passage,** lying between Campobello and Deer islands, though the most circuitous is the broadest, deepest, and best.

Letite Passage, between Macmaster Island and the New Brunswick coast, is alike narrow and dangerous, being only available with local knowledge and during slack tide.

Southern Channel is barely 200 yards wide across the narrows and is between Campobello Island and the mainland to the southwest.

Quoddy Road lies between the southern end of Campobello Island and West Quoddy Head, marked by a lighthouse. It is the usual anchorage for vessels seeking shelter against northerly and westerly winds or waiting for a favorable tide to pass through Lubec Narrows. The entrance between Liberty Point Ledge and West Quoddy Head is about ¾ mile westward, with a least depth of 28 feet near the middle of the entrance; the best water leads about ¼ mile eastward of West Quoddy Head. The anchorage affords shelter against all but east and southerly winds in 12 to 25 feet (low water); vessels anchored here for shelter when the wind hauls eastward get under way and pass through Lubec Narrows to the anchorage in Johnson Bay. The northern and western parts of the roads between West Quoddy Head and Lubec are full of shoals, partly bare at low water, on which are numerous fish weirs.

Bell buoy.—A black bell buoy is moored in 5 fathoms of water in the entrance to Quoddy Roads, about 700 yards 19° from West Quoddy Lighthouse.

Lubec Channel, with 12 feet at mean low water and 8 feet at extreme low water, leads from the roads to Lubec Narrows, and is dredged to a width of 500 feet. The average draft of vessels passing through this channel is 12 feet; the deepest 19 feet. It is only available according as the rise of tide suits a vessel's draft, and as at all times local knowledge is indispensable. It is necessary for sailing vessels to have a fair wind to pass through the dredged channel and The Narrows, the most favorable time being about two hours before high water, but sailing vessels with a strong fair wind can stem an adverse current at any time after half flood or ebb.

Buoys.—The channel is regularly buoyed, red buoys to starboard and black to port entering from the eastward.

Lubec Narrows is a narrow strait between Mulholland Point and the town of Lubec. The channel has been dredged 250 to 400 feet wide and 12 feet deep, and has strong tidal currents and eddies. The narrowest part of the channel is at the northern end.

The tidal currents run at a velocity of 6 to 8 knots at springs through these narrows, and no vessel should attempt them without a pilot or good local knowledge.

Lubec.—The little town of Lubec has a population of about 2,000. There are several fish factories. The wharves in The Narrows are dry at low water and are only used by small craft. The steamer wharf is on the northern side of the town and has a depth of about 18 feet at its end.

Lubec Narrows Light, flashing white, elevated 52 feet above high water, visible 13 miles, is exhibited from a white conical tower, with black lantern and base, standing in 5 feet of water on the western side at the southern end of The Narrows, about ¾ mile from Lubec Neck.

Fog signal.—A fog bell is struck by machinery. (See Light List.)

Mulholland Point Light, fixed white, elevated 60 feet above high water, visible 13 miles, is exhibited from a white octagonal tower, 44 feet high, standing on Mulholland Point, at the southwestern end of Campobello Island.

Johnson Bay, the bight westward of Lubec, affords well-sheltered anchorage for vessels of any draft. It is approached from southward through Quoddy Roads and Lubec Narrows, and from northward through Friar Roads. The southwestern part of Johnson Bay is shoal for a distance of ½ mile from its head, and a shoal with 17 feet over it lies on the western side near the middle. The shores of the bay should be given a berth of about 300 yards. The best anchorage for deep-draft vessels is just southward of a line from Lubec Narrows Lighthouse to Rodgers Island, in 7 to 9 fathoms (low water).

Friar Roads, westward of Campobello Island, has deep water, the bottom, as a rule, is foul, and the tidal currents have considerable velocity. Vessels seldom use it as an anchorage.

Eastport, with a population of about 5,000, is on the southeastern end of Moose Island and is of some commercial importance, its principal business being in lumber, fish, and general merchandise.

Vessels loading usually lie at the wharves, some of which are dry at low water, while others have from 5 to 12 feet at their ends. The best anchorage off the town is in about 8 fathoms abreast the customhouse and quite close to the wharves, where the current has the least velocity.

Pilots—Pilotage is not compulsory.—Canadian licensed pilots, and fishermen who are competent pilots for Maine ports, will be found at Head Harbor, near the northern end of Campobello Island. Canadian pilots can take a vessel into Maine ports, but Maine pilots are not allowed to take a vessel into Canadian ports. Pilots will be found off Little River or in Quoddy Roads. Pilots for St. Croix River and Cobscook Bay can be found at Eastport.

A towboat can be obtained from Calais.

Supplies.—Coal, in limited quantity, and water can be had alongside some of the wharves. Provisions and some ship chandler's stores can be obtained in the town.

Repair.—Light repairs can be made, vessels being hauled out on the beach to be cleaned and calked.

Signals.—Storm signals are shown from a building near the customhouse.

Communication.—Steamers touch at Eastport on their passages between Boston and St. John, N. B. There is railroad communication with Calais and towns westward.

Broad Cove, on the southern shore of Moose Island, to the westward of Eastport, affords good anchorage for vessels of any draft; vessels anchored off Eastport get under way and anchor in Broad Cove or in Johnson Bay to ride out a gale.

Clark Ledge is about 1,400 yards north-northeastward of Eastport. A black iron spindle beacon, 40 feet high, with a cask as a topmark, stands on its eastern side.

Perry Bay.—About 4.5 miles northward of Eastport there is fair anchorage during westerly winds in Perry Bay, but it is exposed to the whole drift of Passamaquoddy Bay with strong northerly or northeasterly winds.

Cobscook Bay, westward of Moose Island, is large and irregular, with several arms which are full of rocks and have dangerous currents, requiring local knowledge to keep a vessel in the channels.

The entrance channel is between Moose Island and Seward Neck. Strangers seldom enter Cobscook Bay, and then only with a pilot.

Good anchorage is found in the coves that are not too full of rocks, but in the channel the currents are too strong and the bottom too rocky for anchorage. During the winter navigation is obstructed by ice.

NEW BRUNSWICK.

Campobello Island, nearly 8 miles long, is partially cultivated and has several fine harbors, especially that of De Loutre, on its northwestern shore. The island is separated from the mainland by a narrow channel, for which at all times local knowledge is necessary.

With the exception of the southwestern shore, the salient points of the island are steep-to and may be safely approached. On the eastern coast Herring Bay, Schooner, and Mill coves are well adapted for temporary anchorage, but when making for the latter care must be taken to avoid a 3-fathom patch about 400 yards off the northern shore of the cove.

Head Harbor is formed between Head Harbor Island and an indentation in the land at the northeastern end of Campobello Island, and though small, is safe, easy of access, and without detached dangers.

East Quoddy Head Light, fixed white, elevated 64 feet above high water, visible 13 miles, is exhibited from an octagonal tower 34 feet high, painted white with red cross, and red lantern; erected on East Quoddy Head, the northern point of Campobello Island.

The light guides vessels to the main channel leading to Passamaquoddy Bay, also to Head Harbor adjoining.

Fog signal.—A compressed air diaphone is sounded from a white square wooden building with a gable roof erected 80 feet northward of the lighthouse on the outermost rock off East Quoddy Head. (See Light List.)

Harbor De Loutre, on the northwestern side of Campobello Island, affords well-sheltered anchorage in a depth of 5 to 6 fathoms, but care must be taken to avoid Racer Rock, about 200 yards in extent, covered with only 1½ fathoms of water; the rock lies a little within the line between the inner part of Man of War Head and the nearest point northeastward, and is distant about 400 yards from both. Strangers should anchor westward of this rock between these points, or, if wishing to go farther in, the services of a pilot should be obtained.

Friar Bay, also on the northwestern side of Campobello Island, is an indentation between the village of Welchpool and Friar Head, about 1 mile distant. Good anchorage may be obtained here in about 10 fathoms, with Mark Island (Popes Folly) just open of Friar Head, and as near as convenient to Welchpool, off which the 5-fathom curve is only 100 yards distant. Vessels of moderate draft may lie alongside Queen Wharf.

Communication.—There is a telegraph station at Welchpool.

Tides.—High water, full and change, at Welchpool is at 11h. 21m.; springs rise 23½ feet, and neaps 20 feet.

White Horse Island, a bare rocky islet, 68 feet high, and of a whitish appearance, is about 2.4 miles 31° from Head Harbor Lighthouse; and as the small islands in the neighborhood are covered with trees, White Horse Island is easily distinguished, and serves as a beacon.

East Rock, with only 1 foot water, lies about 300 yards off the eastern end of White Horse Island, with the northern tangents of White and White Horse islands in line. There is another small submerged patch situated 200 yards 324° from East Rock.

Clearing marks.—Head Harbor Lighthouse open to the northward of White Horse Island, clears these dangers on their northern side, and White Island open southward of White Horse Island, clears East Rock to the southward.

Simpson Ledge—Beacon.—An iron spindle surmounted by an iron slatwork cage painted red and black in horizontal bands, 22 feet high from the ledge to the top of the cage, and 14 feet above high water, has been erected on Simpson (Race) Ledge.

North Rock, with 1 foot water, lies ½ mile 336° from the western end of White Horse Island, with Adam and Barn islands apparently just in range, and has deep water close around.

Islands.—Between Campobello Island and Macmaster and Deer islands are numerous smaller islands and shoals plainly shown on the charts.

Tinkers Ledge is situated southward of Tinker Island, 1.5 miles northwestward of Head Harbor Light.

An iron spindle surmounted by an iron cage topmark is erected on the ledge.

Tinker Island Beacon.—An iron spindle surmounted by a cage, the whole 12 feet high and painted black, is erected on the northern end of the ledge, about 400 yards northeastward of Tinker Island.

Barn Island Ledge Beacon.—An iron spindle surmounted by a cage, 13 feet above the water, the whole painted red, is erected on the ledge off the northeastern end of Barn Island.

Casco Island.—Eighty-five feet high, of an irregular shape, and nearly ½ mile in length, lies 1.4 miles westward of Head Harbor

Lighthouse, and is 1 mile from the nearest part of Campobello Island. Its southern shore may be approached to 200 yards, but the northeastern point should not be neared within 300 yards, in order to avoid a rocky ledge.

Ledges.—Off the western end of the island is a line of detached ledges, 900 yards in length; the northeasternmost ledge shows at half tide, a ledge about the middle uncovers only at very low water, and at the southwestern end there are patches covered by 1½ fathoms.

The depth in the channel between these ledges and Casco, about 600 yards across, is very irregular, with a shoal patch of 2½ fathoms water in the center.

Clearing mark.—The center of White Horse Island, bearing 55° seen between Spruce and Sandy islands, clears these ledges to the westward.

Black (Gull) Rock, of small extent, is always visible, and lies 800 yards 56° from the northeastern point of Casco Island. This rock may be safely approached to 100 yards.

Pope Island, about 300 yards in length, lies nearly in mid-channel between the shores of Campobello and Deer islands, and 1,800 yards westward from Casco Island.

In the channel between Pope and Casco islands is Green Island, as well as a large ledge which uncovers; these, with the ledges westward of Casco, contract the navigable passages to about 400 yards and thus render them difficult for a stranger.

Beacons.—A black iron spindle surmounted by an iron slatwork cage, 28 feet high from the ledge to the top of the cage and 13 feet above high water is erected on Sandy Ledge.

An iron spindle surmounted by a cage, the whole 12 feet high and painted red, is erected on the southern extremity of the ledge extending southward from Sandy Island.

There is a 4½-fathom patch, mid-channel, between Green Island and the coast of Campobello Island.

Pope Shoal, a small detached spot with 1¾ fathoms water, lying about 200 yards southeastward of the southern point of Pope Island.

A safe clearing mark is White Horse Island open to the southward of Casco Island.

Chocolate Shoal, of small extent, covered by 1½ fathoms, with deep water close around, lies midway between the southern point of Pope Island and the northern point of Chocolate Cove in Deer Island.

Deer Point, 216°, open westward of Indian Island, leads close westward of this danger; the western sides of Rouen and Cherry islands in range lead between the shoal and Pope Island.

Indian Island, narrow, and about 1.4 miles in length, with an elevation of 90 feet near its northern end, may be approached to

300 yards, except at the southeastern side, where Cherry and Rouen islands lie on a shoal bank extending out from it ¼ mile. Indian Island lies eastward of the southern point of Deer Island, the narrowest part of the channel between the two being nearly 700 yards wide.

Vessels to or from Passamaquoddy Bay do not use the passage between Indian and Deer islands, on account of the whirlpools off Deer Point.

Cherry Island fog signal.—During thick or foggy weather a fog bell is struck by machinery.

The fog bell, elevated 43 feet above high water, surmounts a white square wooden tower, 17 feet in height, situated on the southwestern point of Cherry Island. (See Light List.)

Deer Island is 6.5 miles in length, with an extreme breadth of 2.7 miles; it is thickly wooded and in some parts attains an elevation of 300 feet. From Little Harbor, on its eastern side, round by the southern point to Doyle Passage, at its northern end, the shore is steep-to and may be approached to 300 yards, except near the northern side of the entrance to North Harbor, where a small cluster of rocks lies at about that distance from the high-water line. From the northern point of Deer Island to Little Harbor the coast is studded with dangers, and its navigation should not be attempted by strangers, more especially as the approaches to it are also difficult.

A wharf has been built by the department of public works of Canada in Cummings Cove, western side of Deer Island. The wharf extends out 385 feet from high-water mark on the bearing 238°; it is 20 feet wide with a block 50 feet square at the outer end.

A red wooden spar buoy marks the shoal at the point on the northern side of Cummings Cove, about 200 yards northwestward of the wharf.

Northwest Harbor, on the eastern coast of Deer Island is a narrow indentation with deep water, only adapted for small vessels, and even these should moor, as the distance between the 5-fathom curve is but 100 yards.

Leading mark.—When off the entrance of this harbor the center of White Horse Island, seen between the Spectacles and Hospital islands, bearing 83°, leads into the anchorage.

Pompey Ledge Beacon is on Pompey Ledge, between Dinner and Bar islands, off Northwest Harbor.

The beacon consists of an octagonal concrete base 11 feet high, surmounted by a pyramid of steel framework 13 feet high, the whole painted black.

It marks an entrance to North West Harbor from the southward, which is used by fishing boats.

Leonardville Harbor is (at low water) a very small and shallow bay within Bar Island and is only adapted for boats or very small vessels. The entrance at low tide is between a rocky ledge, extending 400 yards southwestward from Bar Island and the shore of Deer Island.

Leonardville Harbor Light, fixed white, elevated 59 feet above high water, visible 8 miles, is exhibited from a white square tower with sloping sides, 27 feet high, erected on the cliff at the western side of the entrance to Leonardville Harbor.

Clam Cove, on the western side of Deer Island, affords good anchorage with all winds, except those from south to west, in a depth of about 9 fathoms, in a position about equidistant from the points of the cove and the small islands within.

North Harbor dries 700 yards within its entrance points, and although, with winds off Deer Island, temporary anchorage may be obtained off its entrance, in about 10 fathoms water, midway between the northeastern rocks and the southwestern point of the harbor, the anchorage is inferior in every respect when compared with Clam Cove, 1.5 miles to the southward.

The Town of St. Andrews is situated near the extremity of a promontory, forming the eastern point of the St. Croix River. The streets intersect each other at right angles, and the town is commanded by an elevation, 134 feet high in its rear, on which stands the fort and barracks. It contains five churches, some hotels, and schools. The town is a favorite summer resort.

Port St. Andrew.—The port is a small and shallow tidal harbor, formed between the mainland and Navy Island, the deepest water being from 10 to 16 feet at low water, and about 300 yards in extent, between the 5-foot curve. This port is open all the year.

Wharves.—The principal wharf in the harbor is the new Canadian Pacific Railroad wharf, which is about 350 feet long and 60 feet wide. On this wharf is a warehouse 250 feet long by 30 feet wide for receiving freight. Across the outer end of the wharf the water is 14 feet deep at low water. A railroad track is laid to the end of this wharf, alongside the warehouse, and freight is loaded into and from cars. Another wharf, about 200 feet long, is used by local steamers plying between St. John and coast ports, Grand Manan Island, Campobello Island, St. Stephens, up the St. Croix River, and Eastport, Me. There is a wharf near the customhouse used by a fish-curing establishment and a wharf for the local coal trade. The public wharf extends from the public square 800 feet into the harbor. The outer part was built a few years ago and is 24 feet wide, with a block or T which has a slip that is raised or lowered according to the tides. On the southeastern side of the T is a floating stage with connections with the wharf, enabling passengers to land and embark. A wharf, 150 yards northwestward, is 250 feet long and with its warehouses is used for storing and handling lumber, building materials, etc. This wharf is dry at low tide.

Communication.—There is daily steamer communication to St. Stephen and ports in the State of Maine; it is connected with the Dominion and United States railroad and telegraph systems, and is one of the terminals of the Canadian Pacific Railroad.

Supplies and water are easily obtained. A large number of fishing vessels and others enter and depart from this port. Sardines and other kinds of preserved fish are shipped in considerable quantities.

Hospital.—There is a marine hospital here where seamen can receive medical treatment.

Pilots.—Services of pilots can be obtained before entering port at Machias Seal Island or Passamaquoddy Bay.

Storm signals are hoisted at St. Andrews.

Tides.—It is high water, full and change, at Port St. Andrews at 11h. 32m.; springs rise 25 feet, and neaps 21½ feet.

St. Andrews Light, fixed white, elevated 42 feet above high water, visible 10 miles, is exhibited from a white octagonal lighthouse, 22 feet in height, on the northern point of the eastern entrance to Port St. Andrews. (See Light List.)

Entrance.—There are two entrances, the eastern and western, both dredged to 12 feet at low water. The eastern entrance is between Tongue Shoal and Navy Bar Lighthouse and is marked by buoys, red starboard hand and black on the port. The western entrance is westward of Navy Island and is marked by three red buoys and two stakes, one erected on each side of channel, close southward of West Gut Beacon.

The dangers APPROACHING FROM THE EASTWARD.—One is Niger Reef and the other is northeastward of it marked by a staff and triangle.

Niger Reef.—This danger, about 300 yards in extent, dries 2 to 3 feet at low water; it is marked by a timber block with sloping sides, surmounted by a pole, with a barrel on top, erected 680 yards 293° from the northwestern extremity of Navy Island.

Western entrance is known as West Gut.

A timber block beacon with sloping sides, surmounted by a staff and triangle stands on the southern edge of the old gut through the bar. The beacon is located about 600 yards 43° from Niger Reef Beacon and 1,760 yards 281° from St. Andrews Lighthouse.

Stakes.—Two stakes, with small bushes at their tops, have been placed at the edges of the dredged channel at the western entrance to the harbor at the highest point of the bar. The stake on the northern edge of the channel is located 540 yards 41° from Niger Reef

Beacon and the stake on the southern edge of the channel is located 520 yards 44° from Niger Reef Beacon.

Buoys.—A red conical buoy is moored in 3 fathoms water outside the entrance and on the southern side of the channel about 500 yards 254° from West Gut Beacon.

A red spar buoy is moored southwestward of Niger Reef 160 yards 255° from Niger Reef Beacon.

A red spar buoy moored in 9 feet of water on the southern side of the dredged channel, about 300 yards 101° from West Gut Beacon.

A red wooden spar buoy is moored on the southern side of the eastern end of the dredged channel, about 450 yards 96° from West Gut Beacon.

Anchorage.—There is an anchorage in 10 fathoms, clay bottom, 700 yards southwestward of Joe Point, with Niger Reef Beacon in range with the northwestern point of Navy Island.

APPROACHING FROM THE NORTHWARD AND EASTWARD.

Tongue Shoal is the outer extremity of the shoal ground extending 1.3 miles to the southeastward of St. Andrews Promontory, and at low water dries 500 yards; its highest part being about 24 feet above low water, spring tides.

Buoys.—A red spar buoy is moored off the eastern extremity of Tongue Shoal, 200 yards 140° from Tongue Shoal Lighthouse.

A red spar buoy is moored on the southern extremity of Motts Bar, 1,260 yards 273° from the same lighthouse.

Tongue Shoal Light, fixed white, visible 10 miles, elevated 40 feet above high water, is exhibited from a white square wooden tower, on a frame pier, 10 feet in height, on the eastern part of Tongue Shoal, 1.5 miles 104° from Port St. Andrews Lighthouse.

Fog signal.—During thick or foggy weather a hand foghorn is sounded whenever the fog signals of vessels are heard.

Eastern entrance.—The eastern entrance is between Tongue Shoal and Navy Bar lighthouses. The northern side of the channel is marked by two red spar buoys, and the southern side by a black can buoy outside, and a black spar buoy just inside the harbor.

APPROACHING FROM THE SOUTHWARD AND EASTWARD.

Buoys.—A black wooden spar buoy is moored in 10 feet of water on the extremity of Navy Island Southeast Bar, 425 yards 126° from the southeastern extremity of Navy Island.

A black can buoy is moored off Navy Island East Bar, 1,025 yards 79° from the southeastern extremity of Navy Island.

A red and white can buoy is moored in 33 feet of water, 825 yards 174° from the southeastern extremity of Navy Island.

Navy Bar Light, fixed white, elevated 34 feet above high water, visible 7 miles, is exhibited from a rectangular wooden building on a cribwork pier, and surmounted by a, red octagonal lantern, the whole 36 feet in height and situated 820 yards 60° from the southeastern extremity of Navy Island.

Fog signal.—A bell, elevated 16 feet above high water, is struck by machinery. The bell is installed on a square wooden building, painted white, standing on the southeastern end of the cribwork pier. (See Light List.)

Navy (St. Andrews) Island, upward of 1 mile in length, with an extreme breadth of about 600 yards, lies within ½ mile of the main shore, the intervening space (with the exception of the narrow channel alluded to) being occupied by flats of stones and bowlders, which dry at low water, extending from the island and mainland.

The southern end of the island, terminating in an abrupt white cliff, appears like a wedge, and, although only 37 feet high, is a conspicuous object when approaching from the southward or eastward. The southwestern side of the island may be approached to 300 yards, but from its northern point a spit dries out nearly 800 yards in a northerly direction and is all but connected with the low-water line of the mainland, northwestward of the town. The eastern side of the island is also bordered by an extensive spit of rocks, bowlders, and gravel, terminating in a point, which is marked by Navy Bar Lighthouse.

The 5-fathom curve southeastward of the lighthouse is 400 yards distant, and the middle of the channel into St. Andrews, northeastward of the lighthouse, is also 400 yards distant.

On the northwestern end of Navy Island there is a U. S. Boundary Commission monument.

St. Croix River.—The St. Croix River has its source from a chain of lakes called Chiputneticook, and, running in a southerly direction, enters Passamaquoddy Bay immediately westward of Navy Island, where it is 2 miles in width, narrowing at Joes Point, 2 miles from the mouth, to a little less than 1 mile; from thence to Devils Head, 6 miles up the river, the general width is about 1,600 yards; at the above head the river makes a sharp bend westward, but is navigable at high water as far as the town of St. Stephen on the New Brunswick shore, and Calais, on that of the United States, a farther distance of 6 miles. A 9-foot channel is being dredged as far as St. Stephen, where there is a depth of 10 feet alongside the wharves. Up to Devils Head there are depths of from 7 to 14 or 15 fathoms in the fairway of the channel. On rounding the head the river contracts very much and a bar with 26 feet is crossed, deepening in a narrow channel above it for 1.3 miles, after which there is another bar before reaching the village named The Ledge, above which the tidal navigation, open to vessels of 16 feet draft commences; but no vessel should attempt it without a pilot. As far as Spruce Point there is ample water, though but little width, for vessels of any draft to lie at anchor afloat.

As vessels navigating the St. Croix River should always be in charge of a pilot, it is unnecessary to describe its shores in detail.

Ice.—During January, February, and March the river is obstructed by ice and not navigable except when kept open by tugs.

Dochet Island (United States).—Situated in the middle of the river, 3.7 miles above Joes Point, has rocks and shoal water extending 1.2 miles to the southward from it, and for 300 yards in other directions; the main channel lies on the eastern side of the shoals and island.

Dochet Island Light, fixed and flashing white, elevated 71 feet above high water, visible 12 miles, is exhibited from a lantern surmounting a white dwelling.

Fog signal.—A bell is struck by machinery. (See Light List.)

Buoys.—The northern and southern extremities of the shoals extending from Dochet Island are marked by red spar buoys, and there is a similar buoy near the middle of the shoals on their western side.

Buoy.—A black can buoy is moored in 7 fathoms of water 400 yards 68° from Dochet Island Lighthouse.

Spruce Point Light, fixed white, elevated 32 feet above high water, visible 10 miles, is shown from a white square wooden structure on Spruce Point.

Vessels coming up the river should bring Spruce Point Light to bear 285° and head for it until within 200 yards of Bluff Head.

Mark Point Light, similar to Spruce Point Light, is exhibited on Mark Point.

Whitlocks Mill Light, fixed red, elevated 32 feet above high water, visible 9 miles, is exhibited from a white conical brick tower with black octagonal lantern near Whitlocks Mill, 1 mile above Mark Point, on the south shore.

St. Stephen Harbor is situated at the head of the tidal waters of St. Croix River. Vessels of 600 tons and under load alongside the wharves and lie aground at low water in soft mud. The Ledge, an outport of St. Stephen, has ample water for large vessels to load afloat, is capable of accommodating 500 vessels, and is well sheltered. Vessels of 18½ feet draft can load alongside the principal wharf; the bottom is of soft mud. There are 10 wharves at St. Stephen, with sheds on 5 of them.

St. Stephen is a town of some importance, and contains several churches, hotels, and schools, and has a population of about 3,500.

The chief industries are cotton mills, lumber, soap manufactories, and farming.

St. Stephen is connected by railroad and telegraph with the Canadian and United States systems. There is an electric railroad to Calais and Milltown. Steamers run to St. Andrews, Eastport, Campobello, and Manan.

St. Stephen is a terminus of the Canadian Pacific Railroad. The company has built for railroad and shipping extensive wharves, on which there are railroad tracks.

The United States is represented by a consul and vice consul.

Calais, a town of about 7,300 persons, is on the opposite, United States, side of the river; the two towns are connected by a bridge above the wharves.

The trade is carried on chiefly by vessels of from 10 to 12 feet draft; there is, however, a depth of but 4 feet in the channel at low water for some distance below the towns.

Tides.—At St. Stephen it is high water, full and change, at 0h. 7m.; springs rise 23¼ feet, neaps 20¼ feet.

Chamcook Harbor lies on the eastern side of the promontory on which the town of St. Andrew stands, and is formed between Minister Island and the mainland. The entrance on the northern side of the island, although marked by buoys, is only about 150 yards broad between the rocky ledges on either side of the channel, and has 3 fathoms in it. It is only available for vessels of large draft at a certain time of tide, although when inside there is good anchorage, in a limited space, in 7 to 8 fathoms.

Chamcook Harbor Light, occulting white, elevated 26 feet above high water, visible 7 miles, is exhibited from a white square tower with sloping sides, 27 feet high, erected on the eastern extremity of the reef extending from the northern side of the harbor entrance.

Buoys.—A red conical buoy is moored in a depth of 5 fathoms about 100 feet outside a rock awash off the northern entrance point to Chamcook Harbor.

The entrance channel is marked by a red spar buoy on the northern side and a black spar buoy on the southern side.

The narrows, between the inner and outer harbors, is marked by a red spar buoy on the western side and a black spar buoy on the eastern side.

The coast.—From the southern end of Minister Island to Midjik Bluff the distance is 5.4 miles in an easterly direction, and to the northward of this line the shores of Passamaquoddy Bay are much indented, and in some parts studded with islands.

In each of the bays, and among the islands, anchorage is to be found, but this locality is only frequented by vessels taking in cargoes and on such occasions they should be under the charge of a local pilot.

Hardwood and Hospital islands lie to the eastward of Chamcook Harbor, and off the entrance to Bocabec Bay; together they occupy 1 mile in length nearly east and west, and within them, on their northern side, good anchorage may be obtained in 6 to 7 fathoms, with the southern end of Minister Island in range with the eastern end of Hospital Island, and Midjik Bluff apparently in range with the northern end of Hardwood Island.

Midjik Bluff is at the entrance of Magaguadavic River. A shoal extends 250 yards from it at low water in an east-northeasterly direction.

Midjik Bluff Light, fixed white, elevated 130 feet above high water, visible 15 miles, is exhibited from a square white lighthouse, 29 feet in height, with a brown lantern, on the summit of the bluff. (See Light List.)

Letite Passage.—This passage, at its southern entrance, is about 1 mile, and at its northern entrance 1,400 yards wide, but this space is not available for navigation on account of the islands and shoals lying mid-channel. These, however, with proper precautions, can be passed on either side, but the eastern side is preferable and more direct, care being taken to avoid the ledge off Mascabin Point, Chambers Rock, and the 4¾-fathom spot westward of it. This can be done by bearings of Mascabin Point Light and Letite Island.

A dry ledge extends 200 yards southwestward from this point.

Mascabin Point Light, fixed white, elevated 48 feet above high water, visible 12 miles, is exhibited from a white octagonal wooden tower, 43 feet in height, and surmounted by a red lantern.

Fog signal.—During thick or foggy weather a fog trumpet is sounded from a white square building.

Buoys.—A bell buoy, painted black, and marked "Adam Island" in white, is moored in a depth of 5 fathoms off the northeastern edge of the reef extending from Adam Island.

A light and bell buoy exhibiting a fixed red light is moored in 12 fathoms of water 1,400 yards 324° from Mascabin Point Light; cylindrical, surmounted by a steel frame supporting the bell and lantern and painted red with "Letite" in white letters on the deck.

Beacons.—A black iron spindle beacon, surmounted by a cage topmark, is erected on the ledge situated eastward of Parker Island.

A wooden spindle surmounted by a spherical topmark, the whole painted red, stands on the northern extremity of the ledge at the southern side of the entrance to Catherine Cove, an indentation on the New Brunswick shore between Mathew Cove and Oak Island.

Mohawk Island, with Mohawk Ledge extending 400 yards northward from it, is situated in the middle of the southern entrance to Letite Passage.

Chambers Rock, with ¾ fathom water over it, situated 800 yards 346° from Mascabin Point, is marked by a red conical buoy moored on the eastern side of Letite Passage.

There is a rock, with 4¾ fathoms on it, mid-channel, about 400 yards westward of Chambers Rock.

Letite Rock lies 1,500 yards northward of Mohawk Island and in mid-channel, with a rock which uncovers at low water 200 yards southeastward of it.

Letite Island occupies a central position in the northern entrance.

Beacon.—An iron spindle surmounted by a cage, 12 feet above high water, the whole painted black, is erected on Splitting Knife Ledge, eastward of Parker Island.

Back Bay, an indentation formed between the western side of Cailiff Island and the main shore, at the southern entrance to Letite Passage, affords only temporary anchorage.

Cailiff Rocks, just within the entrance of Back Bay, about one-third of the way across from the western shore, cover at half tide, are detached and about 300 yards in extent. The southwestern end of Bliss Island, in range with the southern point of Pain Island, leads southward, and the eastern end of Barn Island, bearing 206°, leads westward of Cailiff Rocks.

Tidal currents.—The main current of flood sets from between Grand Manan Islands and the coast of Maine in a direct line toward Cape Lepreau, and the ebb in a contrary direction, while the western branch, after passing along the shore of Campobello Island, is divided at its northern point, a portion trending to the eastward, the remainder passing into Passamaquoddy Bay through the various channels. In the Head Harbor Passage the current attains in some places a velocity of nearly 5 miles an hour, but after passing Deer Island it becomes lost in the wide expanse of the bay and is scarcely perceptible until it enters the St. Croix River, where it runs about 2 miles an hour and increases its velocity in the branch of the river leading to Calais to between 3 and 4 knots.

Directions.—Vessels bound to Passamaquoddy Bay, after passing through Grand Manan Channel, should keep a moderate distance from the eastern shore of Campobello Island, and after rounding the northern point steer to pass midway between the western shore of the island and Casco, Pope, and Indian islands, taking care on approaching Pope Island to keep White Horse Island open eastward of Casco Island, in order to avoid Pope Shoal.

Having rounded Cherry Island, steer a mid-channel course between Deer Point and Dog Island, and after passing Kendall Head, the northeastern point of Moose Island, either favor the Deer Island shore or bring the 150-foot hill 332° from Eastport, just open of Kendall Head, bearing 155°, in order to clear Frost Ledge, the extremity of which is marked by a black spar buoy. A closer mark to clear the same ledge is Point Pleasant Church, apparently in range with the eastern tangent of Pleasant Island. Beyond this there are no dangers until approaching Navy Island, off Port St. Andrews, and in case of necessity good anchorage may be obtained in any part of Passamaquoddy Bay in a reasonable depth, with muddy bottom.

The best anchorage, outside Port St. Andrews, is to the northwestward of Navy Island, in about 10 fathoms clay bottom, 700 yards southwestward of Joe Point, with Niger Reef Beacon in range with the northwestern point of Navy Island. When approaching Niger Reef keep the southern point of Navy Island well open of the southwestern shore of the island until the Niger Reef Beacon is in range with the Kirk Spire, bearing 55°, or do not shoal the water to less than 10 fathoms.

Entering the St. Croix River keep the western side of the channel when passing Joe Point, as a patch of 2¾ fathoms lies 650 yards 285° from it, the 5-fathom curve extending out to 900 yards.

L'Etang Harbor, on the eastern side of Letite Passage, affords excellent anchorage under all circumstances; it has two entrances, sufficient area to accommodate a large number of vessels, and is always open during the winter months; for although loose ice is occasionally to be met with in The Narrows, it is never in sufficient quantities to prevent ingress or egress.

Ice.—During the depth of severe winters, ice has been known to extend down the L'Etang River as far as the southern end of the peninsula, but neither the broad part of this nor Bliss Harbor is ever frozen.

Depths.—The depth of water in L'Etang Harbor, as well as in the adjoining anchorage known as Bliss Harbor, is suitable for vessels of the deepest draft, while the holding ground is unusually good. As the rise and fall of the tide amounts to 23.5 feet vessels should moor slack. The town stands on a tongue of land known as L'Etang Peninsula; supplies can not be obtained. The principal occupation is the manufacture of casks for fish.

Bliss Island, off the entrance of L'Etang Harbor, is 1.5 miles long, about 50 feet high, and very irregular in outline; between it and Cailiff Island is Bliss Harbor, a safe and commodious anchorage, where vessels may ride securely with every wind.

From the western end of Bliss Island a rocky tongue projects 300 yards, and off its northern end a rocky ledge extends northward to about the same distance.

Bliss Island Light, occulting white, elevated 55 feet above high water, visible 12 miles, is exhibited from a white square lighthouse with a red lantern 40 feet high; erected on the western end of Bliss Island.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels' signals.

Buoy.—A red conical buoy, moored in 9 fathoms, marks the extremity of the ledge extending from the western point of Bliss Island.

Pain Island, on the western side of the western entrance into Bliss Harbor, is about 400 yards in extent, 109 feet high, and very steep-to on its southern side.

Man-of-war Rock, the only danger to be avoided when using the western entrance, is a ledge 400 yards in length, and its highest part, which uncovers at half-tide, lies one-third of the way across from Man-of-war Island to Bliss Island.

The northwestern side of White Horse Island, in range with the northwestern side (high-water mark) of Bliss Island, leads clear of the ledge.

Buoys.—A black can buoy, marked "Man-of-war Rock," is moored on the southwestern edge of the rock, and a similar buoy on the northeastern edge of Man-of-war Rock.

Channels.—Man-of-war Ledge narrows the main channel on Bliss Island side to about 200 yards, and great precaution is necessary when this passage is taken by a stranger, as the leading marks through are not good; the Bliss Island coast may be approached to 70 yards.

The center of Mink Island, in range with the western extremity of the northern end of Bliss Island, leads through in mid-channel.

There is a passage carrying a depth of 4 fathoms to the northward of Man-of-war Island and Boat Rock, which may be used by vessels of light draft; there is also a narrow channel, in which there is 3½ fathoms, between Man-of-war Rock and the island of the same name. The southern extremity of Adam Island, seen midway between the high-water mark of Pain Island and the islet next to the northeast, leads through this latter channel.

Anchorages.—Anchorage may be selected, either on the northern or southern sides of Bliss Harbor, as most convenient, in order to be beyond the influence of the tides. If on northern side, a good position is in a depth of 6 to 7 fathoms, with Mink Island in range with Pea Island Lighthouse, and the southern end of Pain Island just shut in behind the northern end of Man-of-war Island. On the south side select a berth about the middle of the entrance of Fisherman Cove in about 8 fathoms water, with Pain Island just in range with, or shut in by, the western point of the cove.

Mink Island, a small rocky islet about 70 yards in extent and 20 feet high, lies about 200 yards off the northeastern end of Bliss Island; it is moderately steep-to on its northern side, but should not be approached nearer than 250 yards.

Buoy.—A black can buoy, with "Mink Island" on it in white letters, is moored in 8 fathoms close to the eastward of Mink Island.

Mare Rock, which dries at half tide, lies 400 yards off the eastern shore of Bliss Island and is nearly joined to the rocky spur extending to the southeastward from Mink Island.

Beacon.—An iron spindle, painted black, marks the eastern edge of Mare Rock.

Colt Rock also uncovers at half tide, and lies 200 yards southward of Mare Rock and about 400 yards from Bliss Island. Colt and Mare rocks are both steep-to on their eastern sides; there is no available passage within them to the westward.

Green Islet, about 50 yards in extent and about 20 feet high, stands near the extremity of a rock ledge extending from the eastern side of Bliss Island, and forms an excellent mark for clearing the ledge on which it stands; it should not be passed within 200 yards on its eastern side.

Roaring Bull Rocks, which just cover at high water, lie nearly 400 yards to the northwestward of Pea Island, and narrow the channel of the eastern entrance between them and Mare Rock to about ¼ mile; the wharves at the western end of L'Etang Harbor, just in sight westward of L'Etang Head, clears Roaring Bull Rocks on their western side.

Buoy.—A red conical buoy, with "Roaring Bull" on it in white letters, is moored in 9 fathoms just to the westward of Roaring Bull Rocks.

Pea Island, nearly 200 yards in length and about 25 feet high, lies close off a peninsula on the eastern side of the eastern entrance into L'Etang Harbor; rocks dry off to the southwestward 100 yards, and at the distance of 250 yards eastward of the island and the same distance from the shore is Pea Rock, an isolated low-water rock.

Pea Point Light, fixed white, elevated 51 feet above high water, visible 12 miles, is exhibited from a white square lighthouse erected on the western extremity of Pea Island.

Half-tide Rock is very small and lies 250 yards off the pitch of Deadman Head. A wide clearing mark is the southwest end of McCann Island, just open off Pea Island.

Buoy.—The southwestern side of Half-tide Rock is marked by a red conical buoy, moored about 700 yards 219° from Deadman Head.

Tides.—High-water interval at L'Etang Harbor is 11h. 09m.; mean range 20.3 feet; spring range 23.3 feet.

Directions—Western entrance.—Being to the northeastward of White Horse Island, do not shut in Mascabin Point with Pain Island until the southern end of McCann Island is in range with the northwestern high-water mark of Bliss Island in order to avoid the rocky spur, marked by a red conical buoy, off the western point of Bliss Island, and then steer for Man-of-war Island until the middle of Mink Island is in range with the northwestern point of Bliss Island, 57°, thence proceed with these marks in range nearly in mid-channel southward of Man-of-war Rock, marked by two black can buoys, which will have been passed when Boat Rock is seen open eastward of Man-of-war Island.

Anchorage.—After passing Man-of-war Rock anchorage may be selected, either on the northern or southern side of Bliss Harbor, as most convenient, in order to be beyond the influence of the tides. If on northern side, a good position is in 6 or 7 fathoms, with Mink Island in range with the western end of Pea Island and the southern end of Pain Island just shut in behind the northern end of Man-of-war Island. On the southern side select a berth about the middle of the entrance of Fisherman Cove in about 8 fathoms water, with Pain Island just in range with or shut in by the western point of the cove.

If bound to L'Etang Harbor, after passing Man-of-war Rock steer for the eastern point of McCann Island, being careful not to lose sight of the southern extremity of Adam Island behind Man-of-war Island until past Flea Island in order to pass southward of a 3-fathom shoal off the last-mentioned island. The rocky shoal off the northern end of Bliss Island must also be guarded against, and special care will be needed at this part, especially when the tide is running strong. McCann Island may be approached close-to on the southern and eastern sides, but care must be taken to avoid a low-water rock off its northeastern shore, and this may be done by keeping over toward L'Etang Head, which is steep-to.

After passing this latter danger select an anchorage where convenient; a good position is in about mid-channel, abreast Little Sturgeon Cove, care being taken to keep clear of a rocky patch lying 200 yards off the northern shore.

Eastern entrance.—Bring Jail Island, which lies off the town of L'Etang, in range with the eastern end of McCann Island, bearing 335°; this mark will lead through in mid-channel, clear of all dangers, up to McCann Island, after which proceed as before directed; or bring the wharves at the northern end of the town of L'Etang just open of L'Etang Head, bearing 341°, and these marks will also lead through in deep water on the eastern side of the channel up to L'Etang Head, after which proceed to the anchorage as previously directed.

If wishing to anchor in Bliss Harbor, steer with either of the foregoing marks in range, and when Pain Island is seen open northward of Mink Island, steer for Flea Island until the southern side of Man-of-war Island and the southern extremity of Adam Island are almost in range, bearing 244°, thence steer with these marks in range and select an anchorage where convenient according to previous directions.

Black Bay, between L'Etang Head and Pea Point, is moderately steep-to on its northern shore, but rocky spurs dry out 300 yards from the southern shore. About ½ mile within the entrance and in the center of the bay are two small rocks, which dry at three-quarters ebb, and vessels seeking a temporary anchorage should avoid approaching too near them.

Flea Island, apparently nearly touching Man-of-war Island, leads into the bay clear of danger, and when the southeastern point of Bliss Island appears to touch the small islet off the southern point of Black Bay anchor in about 6 fathoms.

Deadman Bay, on the eastern side of L'Etang Harbor, is open to the southwestward and is only adapted for temporary anchorage with northerly or easterly winds.

Beaver Harbor.—The entrance to this harbor lies about 2.4 miles to the eastward of Deadman Head, the intervening coast being rocky and steep close to the shore, except westward of Little Moose Island, where a rocky patch dries to the distance of 300 yards from the main shore.

The harbor, ¾ mile broad between the entrance points and 1.3 miles deep, is open to the southward and can not be deemed safe during strong winds from that quarter. Vessels should pass in and anchor on the western shore in order to avoid a 2¼-fathom patch near the center of the harbor. Small vessels may anchor in a bay on the western side of the harbor, opposite the village, in 2½ fathoms, clay, where they will be almost landlocked.

The vicinity of Bliss and L'Etang harbors will prevent Beaver Harbor being frequented, save as a place of temporary anchorage.

Buoy.—The western side of the 2¼-fathom patch, in Beaver Harbor, is marked by a red conical buoy, moored in 5 fathoms 50 yards from the edge of the shoal.

Drew Point Light, occulting white, elevated 45 feet above high water, visible 10 miles, is exhibited from a white square lighthouse, 36 feet in height, erected on Drew Point, western side of Beaver Harbor entrance.

Fog signal.—A hand foghorn is sounded at Drews Head Lighthouse in answer to vessels' signals.

Whistling buoy.—A whistling buoy, painted black and white in vertical stripes, with "Beaver Harbor" on it in black letters, is moored in 22 fathoms off the entrance to the harbor 1.5 miles 161° from Drews Head Lighthouse.

Mace Bay is an extensive bight formed between Seely Point and Point Lepreau, the latter lying about 8 miles 98° from the former. From the line between these points the bay is nearly 5 miles deep, the coast line being broken into a series of small indentations, all of which afford anchorage for vessels taking in cargo, but only during fine weather, as the entire bay, with the exception of Seely Cove on its western side, is exposed to the full force of southerly and southwesterly winds.

Seely Cove.—The coast between Beaver Harbor and Seely Point, a distance of 3.3 miles, takes an easterly trend, and may be safely approached to the distance of 400 yards. Seely Point may also be rounded close to, and good anchorage during westerly and southwesterly winds may be obtained on the southern side of the cove in about 5 fathoms. Care must be taken to avoid the northern point of the cove; from there low-water rocks extend nearly ¼ mile in a southerly direction.

Red Head, a cliffy wooded point on the western side of Mace Bay, lies 3 miles 63° from Seely Point, the intervening coast being irregular and, in addition to Seely Cove, forming several small indentations; the cove next westward of the head, being clear of danger, with a moderate depth of water, is well adapted for temporary anchorage.

Mink Bay, on the northern side of Mace Bay, lies between Red Head and Cranberry point and affords temporary anchorage on the northeastern and northwestern sides of Mink Island.

Pope Logan Islet, ¼ mile in length and 65 feet high, lies eastward of Red Head, and from its northern point a rocky ledge extends 300 yards, leaving a channel of the same width, with 2 fathoms water, between it and the mainland. From the southern point a rocky tongue extends to the southwestward, nearly in the direction of Red Head.

Mink Ledge, a rocky patch to the eastward of the above islet, has a small portion on its eastern end which never covers, and thus forms a natural beacon; it lies about ½ mile 54° from the southern point of Pope Logan Islet, and from it a series of rocky patches extends about ½ mile 320°.

Mink Island, about 800 yards across and 104 feet high, lies ½ mile 280° from Cranberry Point, and the same distance from the northern shore of Mink Bay, the channel between having a greatest depth of 3 fathoms. Outside the island a cluster of detached shoals extends ½ mile to the southward, while off its western point there is a detached ledge, which dries at a distance of ¼ mile in the direction of Mink Ledge.

Lepreau Bay, on the northeastern side of Mace Bay, lies between Cranberry Point and the shore northward of Point Lepreau, and runs into the northward to a shallow bight, where small vessels occasionally anchor beyond the reach of any very heavy sea. The only danger on the western side of the bay is off Cranberry Point, from whence a cluster of low water and sunken rocks extends out 300 yards.

Bell buoy.—A black bell buoy is moored 600 yards 153° from Cranberry Point.

Stay Point—Buoy.—A red conical buoy is moored, in 5 fathoms, to mark the rocks extending from Stay Point, on the eastern side of the bay.

The Brothers are two small islets connected at low water, and form the eastern side of the entrance of Lepreau Bay. The larger island, 78 feet high, is distant from the nearest part of Cranberry Point ¾ mile. From these islands a long shingle bar, which dries at low water, extends to the eastward nearly 1 mile, and nearly joins the low-water line of the shore, immediately to the southward of Lepreau Basin.

Lepreau Ledges extend from about 1 mile below Lepreau Basin to the southwestward for a distance of 2 miles, and terminate in a point, which dries 18 feet at low water, at the distance of 1 mile from the eastern shore of Mace Bay.

Clearing mark.—A good clearing mark for all the dangers on the eastern side of Mace Bay is the eastern extremity of Cranberry Point Peninsula, bearing 355°, seen just open westward of the Brothers.

Directions.—Vessels from the westward, intending to use any of the anchorages in Mace Bay, should avoid shutting in the northern point of Seely Cove with Red Head, until past Pope Logan Islet, and (if making for the western side of Mink Bay) when Notch Hill bears 4° steer for it, and by so doing the dangers inside Mink Ledge and off Mink Island will be avoided, and an anchorage may be selected in about 5 fathoms water, with Point Lepreau shut in by Mink Island, or off the western bight in 3 fathoms, with Red Head midway between Pope Logan Islet and the western shore and Cranberry Point just shut in by the southern end of Mink Island.

If intending to anchor on the northeastern side of Mink Island, continue to keep the northern point of Seely Cove just open of Red Head until Notch Hill is seen over the eastern end of Mink Island, when all the shoal water off Mink Island will have been cleared. When the sawmill bears 341° steer for it, and anchor in about 5 fathoms water, with Red Head shut in by Mink Island; or in 3½ fathoms, with Cranberry Point in range with the middle of the larger of the Brothers, and the middle of Pope Logan Island in range with the northern end of Mink Island.

If making for Lepreau Bay, continue with the northern point of Seely Cove just open of Red Head until Notch Hill comes over the eastern end of Mink Island, thence steer for Stay Point, and when Cranberry Point and the northern end of Mink Island are in range the shoal ground, marked by a bell buoy off the former, will have been passed, and a course should be steered into the bay, bearing in mind that the square house at the end of the bay, open westward of Stay Point, clears Hunters Patch, southward of Stay Point, after which anchorage may be selected where most convenient in a depth of about 2½ fathoms.

Current.—A current has been observed with both the flood and ebb to set strongly from the center of Mace Bay toward the Wolves Islands.

Point Lepreau Light, revolving white, elevated 80 feet above high water, visible 14 miles, is exhibited from an octagonal wooden building 54 feet in height, painted in red and white horizontal bands, with a red lantern; erected on low point, 327 feet from the extremity.

The lighthouse is partly hidden on northerly bearings by the fog-signal station.

Fog signal.—A diaphone operated by compressed air. The fog-signal building is a low wooden structure, painted drab, with a brown roof, about 250 feet southward of the lighthouse.

Telegraph.—There is a marine telegraph and storm-signal station at Point Lepreau. A vessel making her official number to Point Lepreau Signal Station is reported immediately and posted in St. John.

Light and whistling buoy.—A light and whistling buoy, cylindrical, painted black and white in vertical stripes, and surmounted by a pyramidal steel frame, supporting a whistle and a lantern, exhibiting an occulting white light, and marked "Lepreau," is moored in 23 fathoms 1 mile from Point Lepreau Lighthouse. From the buoy Wolf Island light bears 242° and Musquash Light 57°.

Dipper Harbor.—The coast eastward of Point Lepreau as far as Split Rock, 11.4 miles, is indented with no less than six harbors. Of these Dipper Harbor, 2.5 miles northeastward from Point Lepreau, is the westernmost. This harbor affords good shelter for small vessels, with winds from southwest round by north to east; vessels should anchor rather on the western shore as some ledges extend off the eastern side.

There is a breakwater in Dipper Harbor which it is proposed to extend.

Dipper Harbor Light, fixed white, exhibited 22 feet above high water from a pole, visible 9 miles, is erected on the public wharf on the western side of Dipper Harbor.

Buoy.—A red wooden spar buoy marks McLennan Reef, on the eastern side of Dipper Harbor, about ¼ mile 318° from Dipper Harbor Lighthouse.

Campbell Islet Light, fixed red, elevated 30 feet above high water, visible 6 miles, is exhibited from a white square lighthouse, 23 feet in height, with a red roof on the southern point of Campbell Islet, northern side of entrance to Dipper Harbor.

Fog signal.—A hand foghorn is sounded at the lighthouse.

Plumper Rock, about midway between Point Lepreau and Dipper Harbor, lies close inshore, and may be avoided by keeping an offing of ¼ mile. Between Plumper Rock and Dipper Harbor the shore is steep-to.

Bell buoy.—A black bell buoy, with "Dipper Harbor" in white letters, is moored in 16 fathoms off the entrance of Dipper Harbor, 1 mile 157° from the lighthouse.

Little Dipper Harbor, about 2.5 miles eastward of Dipper Harbor, should not be attempted without a pilot, as there are numerous dangers to be avoided. The place is only adapted for small craft.

Bell buoy.—A black bell buoy is moored about 500 yards from the entrance point of Chance Harbor.

Chance Harbor, nearly 1 mile eastward of Little Dipper Harbor, is about ½ mile broad at the entrance, by about 1 mile long in a northerly direction, and is easy of access. A flat rock, which dries at low water, lies 100 yards eastward of the western point, and may be cleared on its northern side by keeping Beldon House (near the beach at the head of the cove) open northward of the southern point of Beldon Cove. Farther in, nearly in the middle of the harbor, there is another rock, which dries at half tide; Belden House, seen open southward of the northern point of the cove, leads southward of this rock.

Anchorage.—The best anchorage for small vessels is in Beldon Cove, in about 2½ or 3 fathoms; but this harbor, like the two former, affords but little shelter during winds from southeast, round by south, to southwest.

Reef Point Light, fixed white, visible 11 miles, exhibited 36 feet above high water from an inclosed wooden tower, 30 feet high, square in plan, with sloping sides surmounted by a square lantern, the whole painted white, is erected on Reef Point, western side of the entrance to Chance Harbor.

Buoys.—A black iron can buoy is moored off the extremity of the ledge at Reef Point, western side of the entrance to harbor.

A black wooden spar buoy is moored in about 2 fathoms of water, about 167 yards 317° from the above can buoy marking the northeastern end of the ledge.

Little Chance Harbor, 1.5 miles to the eastward of the above, is a convenient place for small vessels to anchor when waiting for the tide, but affords no shelter whatever with the wind between southeast and southwest. It is about ½ mile between the points of entrance and about 1,600 yards in a north-northeasterly direction. The western point of entrance should not be approached on its eastern side nearer than 400 yards, but the eastern point may be rounded at the distance of 200 yards.

Little Musquash Harbor, about 1 mile farther eastward, is in all respects similar in character to Little Chance Harbor and adapted for the same purpose. The entrance is about 700 yards broad; but a mid-channel position should be maintained, as rocks dry off from either shore a considerable distance, for which no good clearing marks can be given.

Musquash Harbor, nearly 2 miles eastward of Little Musquash Harbor, is ¾ mile broad at the entrance and about 2 miles in length, though but little of this space is available for vessels of moderate draft.

Musquash Head, on its eastern side, is steep-to, and 80 feet high; but Western Head, which attains an elevation of 139 feet, has a small, detached rock with only ½ fathom water about 100 yards from its northern horn. Within this horn, to the westward about 400 yards, a rocky spur extends in a northeasterly direction for a distance of 350 yards.

This harbor should be carefully avoided by large vessels, except as a temporary anchorage, though vessels in charge of a pilot might in case of necessity obtain shelter in the 5-fathom hole about 2.4 miles up the river.

Fog signal.—A hand fog horn is sounded at the lighthouse whenever the fog signals of vessels in the vicinity are heard.

Bell buoy.—A bell buoy, painted black and white in vertical stripes, is moored in 10 fathoms in the fairway of Musquash Harbor, about ¼ mile 262° from the lighthouse.

Whistling buoy.—A black whistling buoy, with "Split Rock" in white, is moored in 30 fathoms off Musquash Harbor, 1.5 miles 186° from the lighthouse.

Split Rock, nearly 1 mile east-southeastward of Musquash Harbor, is 35 feet high and close to a point; from there the land takes a general trend to the northeastward toward St. John Harbor.

Coast.—From Split Rock to Negro Head the coast is bold and fairly straight, with high rocky cliffs covered with trees; from Negro Head the land falls back, forming a bay, in which there is good anchorage for small vessels waiting tide.

Manawagonish Islands lie nearly midway between Negro Head and Partridge Island; they can be avoided by bearings of Partridge Island Light.

With local knowledge vessels may pass inside these islands, and should the weather be bad or fog thick, good anchorage may be obtained between the largest island of the group and the mainland in from 4 to 5 fathoms water.

Tiner Point—Fog signal.—A diaphone, operated by compressed air, is sounded from a rectangular wooden fog-signal building painted white, on the summit of Tiner Point, the most prominent headland between Split Rock and Negro Head. The horn is elevated 100 feet above high water. (See Light List.)

Bell buoy.—A black bell buoy is moored in 12 fathoms of water 144° from the northeastern extremity of Negro Head.

A shoal with a depth of 13¼ feet has been reported 400 feet 318° from the bell buoy.

Lorneville Breakwater Light, fixed white, visible 9 miles from all points of approach by water, is erected on the Lorneville Breakwater, which extends 400 feet northward from Reeds Point. The light is exhibited 19 feet above high water from a pole 16 feet high, with a white wooden shed at the base.

Reeds Point—Buoy.—A black can buoy is moored in 13 feet of water off Negro Point to mark the northeast ledge at Reeds Point entrance to Lorneville.

Dog Rock Ledge—Spindle.—A black iron spindle surmounted by a cage, the top of the spindle 6 feet above high water, is erected on Dog Rock Ledge, near Taylor Island, about 3.5 miles southwestward of St. John Harbor.

Buoys.—A black spar buoy is moored in 10 feet of water off the southern end of Graham Ledge. A red spar buoy is moored in 10 feet of water off the northern end of Graham Ledge.

Musquash Harbor Light, group flashing white, elevated 112 feet above high water, showing green to seaward and white in the direction of the harbor, visible 16 miles, is exhibited from a square lighthouse, 40 feet in height, painted red and white in horizontal bands; erected on the eastern entrance point of Musquash Harbor.

St. John Harbor lies at the head of the bay, into which falls St. John River, the largest in New Brunswick. The bay, upward of 3 miles deep, lies between Manawagonish Island and Mispeck Point, the latter being distant from the former 5 miles, 91°.

The harbor, which is under control of the city corporation, is safe, commodious, and always accessible, and in consequence of the great rise and fall of tide, added to the velocity of the stream, its navigation, even during the winter months, is never impeded by ice. About 1.5 miles southward of the city, Partridge Island forms a natural protection to the harbor, while its light and fog whistle serve as a guide to vessels approaching the entrance.

Courtenay Bay.—Work is now in progress with a view to utilize Courtenay Bay as a portion of the harbor of St. John. A channel having a depth of 32 feet at low water, with a width of 500 feet has been dredged, and a breakwater and dry dock are under construction on the eastern side of the bay. A dry dock, 900 feet in length, 100 feet in width at entrance and 37 feet on the sill, is being excavated at a point southward of the old penitentiary grounds. The breakwater will extend out from the shore immediately eastward of the dry dock 2,500 feet 223° 30′ and thence 2,000 feet 202° 10′.

About 4,890 linear feet of quay walls are being constructed, and an area of approximately 28 acres is being filled in.

Repairs to wooden vessels can be effected at St. John, but not of an extensive kind to iron or steel vessels. Those with a length up to 225 feet on keel and not drawing over 14 feet forward can be placed on blocks if necessary. Large repairs to machinery can be undertaken.

The facilities consist of sets of blocks owned by the city and private concerns for vessels up to 800 tons.

Anchorage.—The best berth for naval vessels in St. John Harbor is on the western side, a little northward of Sand Point Wharf. In this part a vessel will be out of the strength of the tides and will not swing to the flood until the water in the harbor has risen to the level of the water in the St. John River, or about three hours after the commencement of the flood. In this berth the traffic of steamers and rafts will be avoided.

The anchorage grounds in and adjacent to the harbor extend over a wide area. For large vessels there is ample anchorage accommodation; the bottom is composed of soft mud with gravel in places.

The deepest and best sheltered anchorage is off the wharves at Sand Point, but the holding ground is reported to be bad, the bottom consisting of pebbles and small shell.

Berths.—There are at present in use 23 deep-water berths for ocean steamers, with capacious warehouses, 7 berths for steamers drawing not more than 10 feet of water and 1.5 miles of frontage, including slip-faces, at which vessels can be moored and receive cargoes, although grounded at low tide without inconvenience or damage.

Wharves.—There are 40 wharves ranging in length from 200 to 1,540 feet and 15 large sheds, besides coal sheds and pockets. About 18 railroad sidings belonging to the Canadian Pacific Railway Co., the Intercolonial Railway, and the New Brunswick Southern Railway are adjacent to the wharf sheds. At 22 of the wharves the depth of water ranges from 18 to 31 feet at low water. At 18 of the wharves it is 20 feet at high tide.

At St. John West, the Canadian Pacific Railway extends its tracks to the Canadian Pacific Railway Wharf, Union wharves 1, 2, 3, and 4, and New South Rodney 5 and 6, upon which wharves are sheds; the New Brunswick Southern Railway to North Rodney Wharf and Nelson Wharf, upon which is a coal shed. At St. John East the Intercolonial Railway extends its tracks to the Intercolonial Railway ballast wharf slip and to the same slip west and north and to the public wharf to Petingnell Wharf and McLeod Wharf, also to the Intercolonial Railway Wharf east and west.

A number of private wharves are located in the harbor.

The Department of Marine and Fisheries has now under construction a wharf and depot at St. John West, on a site at the end of Nelson Street above Navy Island.

Grain elevators.—The Canadian Pacific Railway has a grain elevator at St. John West from which grain is conveyed to vessels lying at the company's wharf and at the Union wharves. The conveyor is 1,800 feet along the front of the wharves and a conveyor is now being constructed to another wharf. The capacity of the elevator is 1,032,000 bushels and is in constant use during the winter season by transatlantic steamers. The Canadian Pacific Railway is erecting an additional elevator of 1,000,000 bushels capacity. Excellent cattle sheds are connected with the Canadian Pacific Railway wharves, so arranged that cattle are taken into them from the cars at one side and driven aboard the vessels from the other side.

The Intercolonial Railway has connected with its terminal wharf at York Point an elevator with a capacity of 500,000 bushels, equipped with all the facilities for handling grain. The wharf is a crib wharf, tight faced, 535 feet long and 156 feet wide, two tracks, a shed 510 feet long by 118 feet wide, with doors on both sides for handling freight, and two tracks in the center holding 13 cars. Depth of water at this track on each side of the wharf is 30 feet at low spring tide and the same on the harbor front. The Intercolonial Railway has also a crib wharf with large shed for the flour shipped to Bay of Fundy ports.

Cold storage.—A cold-storage plant is owned by the New Brunswick Cold Storage Co., and is located beside and facing the Intercolonial Pier. Any large or small vessel running into the port may easily dock there at any time. There is railroad siding accommodation for 16 cars at one time, operated either by the Intercolonial or Canadian Pacific when required.

The cold store, in addition to large space for general storage, has accommodation of 80,000 cubic feet for fresh fish.

Communication.—Numerous passenger lines of steamers keep up communication with ports in the Maritime provinces, Bay of Fundy, the United States, Montreal, and on the St. Lawrence Route. The passenger traffic with these ports is especially large in the summer season. Trade with the West Indies forms an important item in the operations of this port.

St. Johns is rapidly becoming one of the chief north Atlantic ports in winter traffic for ocean-going freight, passenger, and mail steamers and immigrant vessels. Owing to its favorable location and extensive railroad communication with all parts of Canada and the United States, a number of ocean-going liners and ocean-going steamers enter and depart from this port during the winter especially.

St. John has constant steamer communication with the United States and the British Isles. It is connected with Halifax and Quebec by the Intercolonial; with Fredericton, New Brunswick, and the United States by other lines; and with Montreal by the Canadian Pacific; there is also a shorter route to Quebec than the Intercolonial. St. John is connected by telegraph with all parts of the United States and Canada.

Trade.—The commerce of St. John is very considerable, and has much increased, especially the winter trade, since the opening of the railroad connecting it with the great corn markets of the upper Mississippi basin. Shipbuilding is carried on to a great extent, but has declined of late years.

The increase of trade and traffic has made it necessary to enlarge the berthing and loading accommodations for the large steamers, and extensive improvements have been undertaken and are proceeding on this scale. Grain, lumber, pulp and paper, and agricultural products from the Maritime provinces and western Canada form the chief part of the articles of exports; while merchandise, iron and steel manufactures form the chief articles of import.

Radio.—A radio station is established at this port and communication with vessels at sea, 250 nautical miles from St. John, can be maintained. The harbor regulations are administered by the city corporation, but the Canadian Government has spent large sums of money in improvements and is continuing the work.

Time signal.—The Meteorological Office at St. John exhibits a daily signal by which vessels' chronometers may be checked.

A time ball, painted black with a gold band, is dropped daily, except on Sundays, at the observatory on the northern tower of the new customhouse, 112 feet above the ground and 123 feet above high water. The ball is hoisted half-mast at 0h. 45 m. p. m., close up at 0h. 59m., and dropped at 1h. 0m. 0s p. m., Standard time of the sixtieth meridian, equivalent to 5h. 0m. 0s. Greenwich mean time.

A signal staff on Partridge Island signals vessels bound for St. John Harbor.

Storm signals are hoisted at St. John.

Hospital.—There is a marine hospital at St. John where seamen can receive medical treatment.

Coal.—About 100,000 tons of coal are imported annually, and 5,000 tons kept in stock. The coal wharf is 300 feet in length, with a depth of 20 feet alongside.

Coaling large steamers is done by two barges fitted with proper machinery, each capable of handling 150 tons per hour. There are two coal towers, one on each side of the harbor, for discharging coal.

Supplies of all kinds are readily obtainable and are plentiful.

Port charges.—The port charges are dues according to the regulations of the harbor authorities, consisting of harbor master's fees and anchorage fees, specially arranged for this port, and the Canadian Government charges for sick mariners.

Tides.—High water interval at St. John Harbor is 11h. 08m.; mean range, 20.9 feet; spring range, 23.8 feet.

The great volume of water which runs through St. John Harbor during the freshets, from the melting of the ice and snow in April and May, causes a continual superficial ebb, the velocity of which varies from 2.5 to 5 knots an hour; underneath this outset, sometimes 5 fathoms deep, the tides ebb and flow regularly. Abreast the city the tidal current runs in an hour after the time of high water by the shore in consequence of the difference of level already alluded to; here also as a rule the flood is weak, but the ebb runs rapidly down past Manawagonish Island.

Depths.—The soundings for several miles to the southward of Partridge Island range from 7 to 15 fathoms, and as the bottom is muddy, this area is admirably adapted for vessels anchoring while waiting for the tide.

Breakwater.—A breakwater about 750 yards in length runs out in a 149° direction from a position about 100 yards southwestward of Negro Point for the purpose of protecting the harbor from the violence of the sea during the prevalence of southwesterly gales.

Partridge Island protects the harbor on the southern side, and from Partridge Island to the head of the harbor the distance is 2.5 miles.

Prohibited anchorage.—A water pipe has been laid between Negro Point and Partridge Island.

The pipe lies in a straight line between the flagstaff at Fort Dufferin and the derrick on the west pier at Partridge Island, which bears 134° 50′ from the flagstaff.

Mariners are cautioned not to anchor within 100 yards of the water pipe.

Partridge Island, off the entrance of St. John Harbor, is 600 yards in length and 80 feet high and distant rather more than ½ mile from Negro Point on the mainland, but the breakwater, which extends to the southward from Negro Point, approaches the island to within 400 yards, there being a depth of 12 feet in the channel between.

From the southern end of Partridge Island rocks dry out to the distance of 200 yards in a southwestern direction, and from the northeastern side of the island the low-water line of the Partridge Reefs extends 300 yards northeastward.

A quarantine station for St. John is located at Partridge Island.

Channel—Depths.—There are two channels, known as the east and west, one on each side of the island; the one on the west side is used by vessels of shallow draft only. The one on the east is the main channel and has been dredged at the entrance to the harbor and carries a depth of not less than 28 feet at low water for a distance of 6,000 feet, with a general width of about 650 feet. After this channel is passed the depth and width toward the head of the harbor increase greatly, being from 50 to 70 feet in depth, and even greater in parts, and about 2,000 feet wide. Beacon Bar, formerly on the west side of the main channel, has been removed and the depth of water at that point is now 32 feet at low water. The depth of water along the wharves at St. John West is from 26 to 30 feet and in Sand Point slip 32 feet.

Partridge Island Light, flashing white, elevated 119 feet above high water, visible 17 miles, is exhibited from an octagonal lighthouse 40 feet in height, painted with vertical stripes of red and white, having a red polygonal iron lantern; erected on the summit of the island.

Fog signal.—During thick or foggy weather a diaphone horn is worked by compressed air from a tower situated 300 yards south-southwest of Partridge Island Lighthouse.

A brick rectangular-shaped engine house, with a slate roof, adjoins the fog signal tower.

Marine telegraph and signal station are on Partridge Island.

Signal and radio stations.—Radio station call, V C V. A vessel making her official number to the signal station at Partridge Island is reported immediately and posted at St. John.

Light and whistle buoy.—A combined light and whistle buoy, cylindrical in shape, painted black, exhibiting an occulting white light is moored about 2.7 miles 201° from Black Point. During the months of May, June, and July of each year this buoy will be moored about 1.2 miles 161° from Partridge Island Lighthouse.

Submarine bell buoy.—A submarine bell buoy, cylindrical in shape, surmounted by a pyramidal steel frame supporting a gong, sounded by the motion of the buoy on the waves, is moored near Black Point Light and Whistle buoy. It is treated as a unit with and moved at the same time as the light and whistle buoy.

Light and bell boat, painted black and showing an occulting white light, is moored in 26 feet water ¼ mile 76° from the lighthouse to mark the eastern side of Partridge Reefs.

Off the northern end of the reefs a conical buoy painted black is moored in 18 feet 560 yards 17° from the lighthouse.

Light buoys.—Two cylindrical light buoys, painted red and showing from each a red light, are moored about ¾ mile northward Partridge Island Lighthouse; one to mark the edge of the shoal on the eastern side of the channel and the other to mark the turn in the channel.

Bell buoy.—A bell buoy, painted black, is moored on the western side of the channel at the turn opposite the light buoy.

A red can buoy painted with "Round Reef" in white letters is moored eastward of the spit to indicate Round Reef on the eastern side of the channel.

Pilots.—The St. John pilot boats will generally be found to the southward of the line between Gannet Rock Light and Brier Island and between Machias Seal Island and Little River on the coast of Maine.

Pilots are always on the lookout and are sometimes fallen in with in the vicinity of Machias Seal Island. During a fog by firing a gun occasionally they will generally find the vessel.

It is very desirable that vessels should take a pilot before entering St. John Bay, for instance, at Point Lepreau, if not farther down, for during thick weather the rapid tides, particularly during the freshets, render the navigation of the bay unsafe to a stranger. Tugs are always available off the harbor's mouth and occasionally off Point Lepreau.

Shag Rocks, which cover at half flood and dry at low water, are 800 yards in extent, and their outer end lies about 1,400 yards from the shore between Sheldon and Negro Points. Near their outer end a small rock dries 6 feet at low water. These rocks can scarcely be described as dangerous, inasmuch as they lie within the line joining Sheldon Point and the northern end of Partridge Island. By not opening out Red Head, on the eastern side of the entrance north of Partridge Island, these rocks will be avoided.

Banks and shoals.—As a description of the various banks and shoals in detail would answer no useful purpose, the seaman is referred to the chart, where the relative positions of the various dangers are shown.

Negro Point Light, occulting white, 40 feet above high water, visible 8 miles, is exhibited from an open-frame hexagonal white tower, 35 feet in height, 50 feet from the end of Negro Point breakwater.

Reed Point Light, fixed red and white, elevated 42 feet above water, visible 5 miles, is shown from a lamp-post, 21 feet in height, on Reed Point Wharf, on the eastern side of St. John Harbor.

Range lights.—**Rear light,** fixed white, composed of two lamps, each in the focus of a reflector, exhibited from a steel skeleton tower, surmounted by an iron box containing the illuminating apparatus, erected on Sand Point, western side of the harbor.

Front light, similar to the rear, is exhibited from a wooden tower, surmounted by an iron box containing the illuminating apparatus, erected on the wharf, about 400 yards 146° from the rear light. A diamond-shaped slatwork daymark, painted white, is attached to the front face of each tower.

The two lights in range bearing 326° will lead up from Partridge Island Light and Bell Boat to the turn in the channel ¾ mile farther up. (See Light List.)

Directions.—In making St. John Harbor in foggy weather, attention to the lead should keep a vessel out of danger, as by its assistance an anchorage can be taken up within sound of the fog signal at Partridge Island, and a lift in the fog awaited.

Unless in case of necessity, strangers should never attempt to enter St. John Harbor without the assistance of a pilot, for the channel is bordered with sharp rocks and numerous accidents have occurred to vessels attempting the navigation without local knowledge.

Should the ebb have commenced, vessels should not attempt to gain the harbor until the next half flood, but under such circumstances should remain outside and not anchor in the channel, where the ebb tide, especially during the freshets in the spring of the year, is so exceedingly rapid as to prevent any anchors holding.

Heavy draft ships have formerly been recommended not to leave the harbor later than 1½ hours after high water, but the new channel is dredged so that vessels of the largest size can use it at any time of tide.

To enter the harbor on the eastern side of Partridge Island, steer for the range lights, bearing 326°, so as to pass about 200 yards the light and bell boat off that island. This course will carry clear of the ledges and lead up the new dredged channel to the red-light buoy, marking the turn on the eastern edge of the channel and the bell buoy marking the turn on the western edge of channel opposite the light buoy. Then alter the course so as to pass the upper red-light buoy and farther on the red buoy marking the eastern edge of the channel; thence up the middle of the harbor, anchoring off the wharves of the city or in the anchorage recommended for naval vessels.

St. John River rises in the State of Maine and has a total length of about 450 miles, some of its sources being near the right bank of the St. Lawrence, the chief affluents being the Aroostook and the Tobique. It is navigable for large vessels as far as the Falls, and beyond them for small vessels for 88 miles as far as Fredericton (the capital of the Province, with a population in 1909 of 8,000), and can be ascended by light-draft steamers for a farther distance of 69 miles to Woodstock. During the rainy season boats can ascend to the Grand Falls, a cataract between 70 and 80 feet in height, and distant 225 miles from the sea. The river is also navigable, by small steamers, for a distance of 40 miles above the Falls to the mouth of the Madawaska River. The United States is represented at Fredericton by a consular agent.

The Falls.—A little more than 1 mile above the city are the Falls—narrow channels, about 80 yards in width and about 700 yards apart—where at low tide the surface of the river water is from 11 to 15 feet above that of the sea. As the ordinary tidal rise is from 21 to 23 feet, the sea level at high water is (except in great freshets) from 6 to 8 feet higher than the waters of the river.

Thus there are two falls during every tide, viz, one outward and one inward, and vessels can pass only when the waters of the ocean and those of the river are on a level, and this occurs only for the space of about 10 minutes during each ebb and flow of the tide. At all other times it is either impassible or extremely dangerous. During great freshets, which generally happen between the beginning of April and the middle of May from the melting of the snow, the falls are absolutely impassible to vessels bound up the river, as the tide does not rise to the river level.

Immense quantities of timber are rafted down from the forests of the interior to the City of St. John, which is also an entrepôt of the agricultural and mineral products of a wide extent of country.

St. John, the most important city in New Brunswick, though not the capital, contains a population of about 60,000, and is regularly laid out on the rugged and uneven ground of a rocky peninsula, projecting into the harbor at the entrance of the St. John River. From the sea it presents an imposing appearance. It contains several hotels, 40 churches, 17 banks, two theaters, besides mills and factories. On the western side of the entrance stands the town of Carleton, included in the municipality. The United States is represented by a consul and vice consul.

Bridges—Tide boards.—Two bridges span the narrow entrance of St. John River immediately above the lower falls, the Cantilever Railroad Bridge and the Suspension Bridge for general traffic, under both of which vessels ascending the river must pass.

Two tide boards are erected in the vicinity of the bridges to indicate to vessels the clear head room under the bridge at various stages of the tide. One of the boards is fixed to the face of the rock on the northern side and western end of the bridges, the other is on Cushings Wharf, about 800 yards above the bridge.

Balls Creek.—In the bay, between Mispek Point and Cape Spencer, there are several creeks, the largest of which, Balls Creek, is about 150 yards wide. Small vessels can ascend the creek during the flood and lie aground in safety along the inner side of a small pier. On nearing the entrance of the creek, bring the end of the pier about midway between the two shores, in order to avoid a rocky spur which runs off nearly 200 yards from the eastern point.

Black Rock, of small size and 10 feet high, lies about ½ mile from Conley Head, a point in the middle of the bay just described; the rock is steep-to all round, without offlying dangers.

Mispek bell buoy is moored about ¾ mile westward of the above rock.

Cape Spencer.—A bold headland, from 400 to 600 feet high, with steep, rocky cliffs, is thickly wooded, and lies about 3.7 miles from Mispek Point, with a bay between, which only affords shelter with winds from north round to east.

The coast from Cape Spencer to Cape Enrage, on the northern side of Chignecto Bay, is bold and thickly wooded, varying in height from 400 to 900 feet, and divided into hills by numerous valleys, through which small streams find their way to the Bay of Fundy.

The mouths of these streams are very similar in appearance, being composed of a bar of shingle and gravel across the entrance, leaving a narrow passage at one side through which small vessels may enter at high water, and lie on the mud at low water, generally safe from all winds. Here vessels load with timber, sawn by mills near the entrance, from logs brought down the streams.

Rip.—Off Cape Spencer a rip, which is very heavy with westerly winds, is formed on the ebb; it is caused by a strong eddy sweeping round to the bay to the westward of the cape, and impinging on the ebb tide at right angles.

Cape Spencer Light, fixed and group flashing white, elevated 207 feet above high water, visible 20 miles, is exhibited from a square building with a tower, 35 feet in height, painted red, with one white horizontal band, erected on Cape Spencer.

Fog signal.—A diaphone, operated by compressed air is sounded. The fog signal is installed in a rectangular wooden building painted white, with red roof, standing southwestward of the lighthouse and near the end of the cape.

Anchorage.—During the summer months vessels may anchor along the whole length of the coast from Cape Spencer, at a moderate distance from the shore, the best place for sheltering from the prevailing westerly winds being Quaco Bay.

McCoy Head, about 8 miles eastward of Cape Spencer, is a rounded point about 200 feet high, and thickly wooded; the coast between the two points forms a considerable indentation, at the head of which is Black River, which dries across its entrance, but is accessible at certain times of tide for small vessels, though it is said to be unsafe at high water during heavy southwesterly gales.

The shore between Cape Spencer and Black River is steep-to, except in the immediate vicinity of a point about 3.4 miles to the westward of Black River, where rocks (covering at a quarter flood) dry off 200 yards from the shore. There are also some rocks extending 400 yards 239° from the point next eastward of Black River.

The Sisters consist of a small cluster of rocks about 1,200 yards from the shore near Emerson Creek and about 2.3 miles to the westward of McCoy Head. The outer rocks of the cluster cover at two hours ebb, but the inner rock, about 200 yards farther inshore, only shows at low water. There is deep water between these rocks and the shore.

Bell buoy.—A black bell buoy is moored in 9 fathoms of water on the southern side of Sisters Rocks, 100 yards 171° from the southeastern rock.

Red Head, about 3 miles eastward of McCoy Head, is composed of red cliffs about 50 feet high. Just within McCoy Head to the eastward good temporary anchorage may be obtained sheltered from northerly and westerly winds, in a depth of 5 or 6 fathoms, with Rogers and Red heads just in range. The entrance of Tynemouth Creek lies about 1.5 miles to the eastward of Red Head.

Rogers Head, about 7.5 miles eastward of McCoy Head, is about 400 feet high, thickly wooded and steep-to with high perpendicular cliffs on its western side and a steep slope to the southward.

Quaco Head, 250 feet high, is about 2 miles to the eastward of Rogers Head, being separated therefrom by a valley clear of trees. At the latter head a sharp trend of the land to the northward forms the western side of Quaco Bay. A rock, the site of the old lighthouse, lies 400 yards 104° from the lighthouse.

The lights and fog signals in the Bay of Fundy on the south coast of New Brunswick eastward of Quaco Head are discontinued in winter while navigation is closed, normally from about January 10 to April 1.

Rip.—A tide rip occurs off Quaco Head, occasioned by the tide sweeping around the bay to the southward and meeting the main currents of the flood and ebb off the lighthouse.

Quaco Head Light, flashing white, elevated 110 feet above high water, visible 16 miles, is exhibited from a white square lighthouse, 49 feet in height, on Quaco Head.

Fog signal.—A diaphone fog signal is sounded. The fog-signal house, 70 feet from the lighthouse, is painted white with a brown roof.

Quaco Shoal, on which there is as little as 1½ fathoms water, is about 1 mile in length north-northeast and south-southwest, and occupies a considerable portion of Quaco Bay. There is deep water all around it.

Buoy.—A red conical buoy, with "Quaco Shoal" in white letters, marks the southwestern end of Quaco Shoal.

Bell buoy.—A black bell buoy, marked "Quaco Reef," in white, is moored in 10 fathoms off the shoal ground extending southeastward from Quaco Head, ½ mile southeastward of the lighthouse.

The buoys are replaced by red spar buoys about February 1 of each year, the conical buoy and bell buoy being put back as soon as the state of the ice permits.

St. Martins Light, fixed red, elevated 31 feet above high water, visible 7 miles, is exhibited from a white pole, 29 feet in height, on the outer end of the West Breakwater from the outer end.

Breakwaters.—Two breakwaters form a small artificial harbor at the mouth of Vaughan Creek for the accommodation of coasting vessels. The East Breakwater (the larger of the two) extends in a southwesterly direction and the smaller one extends southeastward from the cliff on the western side of the mouth, the entrance being 168 feet wide between the two breakwaters.

Repairs.—Inside the harbor is cribwork with 17 feet of water at one end and 12 to 14 feet at high water at the other end. At the head of the harbor is a block at which small vessels are repaired, and a shipyard.

NOTE.—The deepest water in entering the inner harbor is close to the light.

Fog signal.—A hand foghorn is sounded.

Tides.—High water, full and change, in Quaco Bay is at 11h. 35m.; springs rise 30 feet, neaps 25 feet. With the exception of the first hour flood the tide, both flood and ebb, sweeps around Quaco Bay from the eastward inside Quaco Shoal.

Anchorage.—Vessels proceeding to the temporary anchorage under Quaco Head, should, on approaching the lighthouse from the westward, keep McCoy Head open of Rogers Head, until the Roman Catholic Church tower of St. Martins is seen open eastward of the northern cliff of Quaco Head, in order to clear the outer end of the ledge marked by a light and whistling buoy.

The anchorage is in 5 or 6 fathoms, mud, ½ mile north-northeastward of Quaco Head Lighthouse. There are no good leading marks and it is unsafe with winds from northeast through east to south.

Shipbuilding is carried on near Quaco Head, as well as in some of the creeks along the shore, and timber is exported.

Quaco Ledge is a most dangerous ridge of rugged rocks about ¼ mile in length, with deep water close around. The highest part uncovers half an hour after half ebb, and dries 13 feet at low water, and shows a heavy tide rip when covered. This danger lies 8.5 miles 126° from Quaco Head Lighthouse, and 14.7 miles 268° from the western end of Isle Haute. The tidal current runs about 2 knots an hour in the vicinity of this danger.

Light and whistle buoy.—A red cylindrical buoy marked "Quaco Ledge" in white, and surmounted by a pyramidal frame supporting a whistle and lantern, from which an occulting red light eclipsed at short intervals is exhibited, is moored in 10 fathoms, 400 yards northwestward of Quaco Ledge.

Found Head.—From McCumber Point, on the northeastern side of Quaco Bay, the shore between it and Found Head is clear of danger. Found Head is distinguished by its perpendicular red cliffs from 300 to 400 feet high.

Tuft Point, also known as Long Beach, lies about 5 miles to the eastward of Found Head, and is formed by an earthy bank from 30 to 50 feet high, partially cleared.

Salmon River is about 1.7 miles westward of Tuft Point and between the two the 5-fathom curve extends upward of ¾ mile from the coast, while the low-water line of the beach just westward of Tuft Point extends nearly ½ mile off.

There are two breakwaters extending out from either side of the mouth of the Salmon River.

Salmon River Light, fixed white, visible 11 miles, is exhibited at an elevation of 32 feet from a pole with shed at base, erected 8 feet within the head of the western breakwater of Salmon River.

Martin Head, about 8.3 miles east-northeastward of Tuft Point, is a small bare hillock 100 feet high, connected with the main shore by a narrow causeway of gravel and sand ½ mile long. When seen from a distance the head makes like an island. It may be approached within ¼ mile, save on its western side, where there is a small patch of rocks which dry 5 feet at low water 700 yards offshore. Nearly 1 mile from the shore is a patch of 2½ fathoms water, to the southwestward of which, as far as Wolf Brook, and to the northeastward of Martin Head, as far as Goose Creek, the 5-fathom curve extends 1,400 yards.

Martin Head Light, occulting white, visible 17 miles, is exhibited 137 feet above high water from a white square wooden building with red octagonal iron lantern rising from the middle of a hip roof. The height of the structure from its base to the top of the ventilator on the lantern is 38 feet; erected on the southern extremity of Martin Head.

Bell buoy.—A bell buoy, painted black and white in vertical stripes, is moored in 10 fathoms of water 300 yards 127° from Martin Head Lighthouse.

Matthews Head, a bold and rounded point 150 feet high, 10.5 miles east-northeastward of Martin Head, is partially cleared, but within it the land rises to a height of 712 feet and is thickly wooded. Between the two heads there are five creeks, but no offlying dangers, and the shore may be approached to ¼ mile.

Wolf River Light, fixed white, exhibited 28 feet above high water, from a pole with a white wooden shed at the base and visible 6 miles over a small arc, the axis of which bears 35°, is erected on the southern end of the gravel bar within the entrance to Wolf River.

Herring Cove.—Herring Cove, situated ½ mile northward of Matthews Head, is a wood loading port.

There is an outer and inner harbor; the outer is known as Herring Cove and the inner Alma Harbor.

All cargo is loaded from small schooners, which receive the greater part of the wood from a sawmill, about 3 miles from the vessel, up a small river. Pilotage is compulsory. A pilot will come off to the vessel when approaching the cove to anchor the vessel in berth. Great care must be taken when entering the cove, as the water shoals rapidly toward the head of it. At low water the shoals are dry for a considerable distance from shore.

Alma, a small village of about 200 persons, lies at the head of Herring Cove.

Landing there is only possible by small boats, from three hours before to three hours after high water. Landing at any other time necessitates a walk of half an hour to the village. Half a mile of this walk is over a rocky beach. Provisions are good. Dense fogs are prevalent.

Alma Light, fixed red, 26 feet above high water, visible 6 miles, is exhibited from a white wooden pole 25 feet high, with a shed at the base, erected on the outer end of the public wharf at Alma.

Wharves.—There is a continuous wharf along the shore 400 feet in length and 50 feet wide, and above the bridge is a wharf 100 feet long by 70 feet wide; depth of water at the wharves about 16 feet. Landing is only possible in small boats from three hours before to three hours after high water.

Anchorage.—The anchorage in Herring Cove is good, and bottom soft mud.

Vessels lie at single anchor in 6 fathoms at low water.

Alma Harbor is open all the year.

Supplies.—Provisions may be obtained at Herring Cove. Fresh water is obtained from a tug at three days' notice. There are no facilities for repairs.

Tides.—Mean range, 33 feet; spring range, 37 feet.

Salisbury Bay.—Between Matthews Head and Cape Enrage, upward of 8 miles in an easterly direction, the land recedes about 3 miles to the northward, and forms Salisbury Bay.

Owls Head, 700 feet high, and thickly wooded, is 3.5 miles eastward from Matthews Head.

Red Head.—Composed of earthy cliffs from 50 to 100 feet high, is midway between Owls Head and Cape Enrage.

Anderson Hollow, where there is a harbor of refuge protected by a breakwater, is 600 yards northeastward of Red Head.

Anderson Hollow Light, fixed white, elevated 26 feet above high water, visible 8 miles, is exhibited from a pole, 22 feet in height, situated on the outer end of the Government breakwater.

NOTE.—If for any reason it is impossible to exhibit the breakwater light a fixed red light will be shown from an unused lighthouse on the mainland and directly opposite the extremity of the breakwater.

Fog signal.—A hand foghorn is sounded at the lighthouse.

Salisbury Shoal, about 1.7 miles in length between the 5-fathom curve, lies 1,400 yards within the line between Matthews Head and Cape Enrage, with 3½ fathoms water on its shoalest part, near the center, and can not therefore be deemed a danger to vessels of fairly moderate draft. Within it there is a channel 1 mile wide, having depths of from 5 to 7 fathoms. The 3½-fathom spot lies 3.7 miles 269° from Cape Enrage Lighthouse.

Anchorage.—During the summer months vessels may anchor along the whole length of the coast from Cape Spencer at a moderate distance from the shore, the best place for shelter from the prevailing westerly winds being Quaco Bay.

Salisbury Bay is unsafe in consequence of the frequency of westerly and southwesterly winds, to which the bay is exposed, and of the sudden shifting of the wind to these quarters. The tidal current generally sets toward Cape Enrage Lighthouse.

Cape Enrage is composed of perpendicular rocky cliffs about 100 feet high and thickly wooded, except in the immediate vicinity of the lighthouse, which stands close to the extremity of the cape. From Cape Enrage a rocky spur, which dries at low water, extends in a southwesterly direction ¼ mile.

Bell buoy.—A black bell buoy is moored in a depth of 12 fathoms off the southern end of the reef extending from Cape Enrage 1,600 yards 170° from the lighthouse on the cape.

Cape Enrage Light, fixed white, elevated 125 feet above high water, visible 15 miles, is exhibited from a white square lighthouse, 29 feet in height, with sloping sides, and surmounted by a red octagonal iron lantern, erected on the pitch of Cape Enrage.

Fog signal.—A compressed-air diaphone is sounded at Cape Enrage.

The fog-signal building is of gray stone with a slate roof, and is situated 43 yards south-southwestward of the lighthouse at an elevation of 100 feet above high water.

Chignecto Bay divides the shores of New Brunswick and Nova Scotia at the head of the Bay of Fundy and leads into Cumberland Basin and the Petitcodiac River; it is free from off-lying dangers, and even in thick weather the gradual decrease of soundings on either side is sufficiently well defined to insure safe navigation.

At Cape Enrage the breadth of the bay is considerably decreased, and the northern shore is deflected more to the northward for a distance of about 10 miles, as far as Grindstone Island, northward of which the Shepody River flows into the bay, while in the southern or Nova Scotian shore the coast continues its general northeasterly trend toward Boss Point, at the entrance of Cumberland Basin.

Abreast Grindstone Island, Cape Maringouin divides the water into two branches, the northern of the two running northward toward the mouth of Petitcodiac and Memramcook Rivers, and the other with a northeasterly trend flowing into Cumberland Basin.

The land on the New Brunswick shore is moderately high, thickly wooded, and intersected by numerous valleys; the southern shore is not so elevated, and the thick woods which generally prevail are intersected with cranberry barrens, which abound with deer.

Two Rivers Harbor, about 4 miles north-northeastward of Cape Enrage, is entirely dry at low water. A narrow channel leads from the deep water of Chignecto Bay to the Government Wharf at the head of the harbor. The bottom of this channel is about 7 feet above low water, but springs rise 36½ feet and neaps 30 feet, thus giving depths in the channel at high water of 29½ and 23 feet.

Vessels should not attempt to enter this harbor without local knowledge.

Beacons.—Two beacons, consisting of masts surmounted by triangular slatwork topmarks, are erected on rocks 90 feet apart, one on each side of the channel. These beacons are removed during the winter months.

Horton Flats.—The shores on either side of Chignecto Bay may be safely approached to ½ mile, except in the vicinity of Horton Flats, about 7 miles north-northeastward of Cape Enrage. Between this position and St. Mary Point flats extend in a straight line a considerable distance off the high line, which here forms a bay.

Grindstone Island.—Grindstone Island, on which are some grindstone quarries and where good building stone is to be obtained, is about ½ mile in length and 122 feet high, and lies on the western side of the entrance to Petitcodiac River, and about 1 mile eastward of St. Mary Point, the southern point of entrance to Shepody River.

Grindstone Island is used as a lumber port during the summer. The prevailing northeasterly winds cause a short sea, which very much interferes with loading cargo.

Anchorage.—There is good anchorage in 5 fathoms and steamers moor with 45 fathoms of chain on each anchor. The entrance is well buoyed and not difficult. Cargo is handled by vessel's gear from lighters, and the work of getting it on board must be done by the vessel's force. The stevedores' responsibility stops when the lighters are alongside.

Supplies.—Provisions in moderate quantities are obtainable and drinking water of good quality is delivered by water boat. There is no coal to be had.

Grindstone Island Light, occulting white, visible 15 miles, is exhibited 93 feet above high water from a white hexagonal, reinforced concrete tower, 59 feet in height, strengthened by six flying buttresses and surmonted by a red, octagonal, iron lantern, near the western extremity of Grindstone Island. The lighthouse should not be approached on its western side nearer than 800 yards.

Fog signal.—A compressed-air diaphone is located in a wooden structure painted white, with a brown roof, at the lighthouse.

Grindstone Bar Buoy, a red nun is moored in 8 fathoms of water 3.5 miles 219° from the lighthouse.

Grindstone Shoal, about 1,200 yards 179° from the lighthouse, with 1¾ fathoms, is the shallowest part of a narrow bank of sand and mud nearly 4 miles in length, the northeastern end of which is a little southward of Grindstone Island, from whence it extends 215°.

Two black can buoys, with cage on each, mark the southern and northern end of Grindstone Shoal.

Channels.—There is a channel with 7 to 8 fathoms in it between Grindstone Shoal and Horton Flats, and another with 5 to 6 fathoms in it between Grindstone Island and the northern end of Grindstone Shoal.

Grindstone Reef Buoy, a red conical buoy, is moored in 3 fathoms of water, westward of the lighthouse.

St. Mary Ledge extends from St. Mary Point, ¾ mile, northeastward. Its highest point covers at 4 hours' flood, and when uncovered may be approached to 200 yards on its southeastern side.

A black can buoy is moored in 3 fathoms of water, eastward of the ledge.

Jones Ledge lies northward of Grindstone Island Light.

A red nun buoy is moored in 3 fathoms of water, about 1 mile 339° from the lighthouse and northwestward of the Jones Ledge.

The above buoys mark the channel to Grindstone anchorage northwestward of Grindstone Island.

Shepody River.—This river flows into Chignecto Bay immediately to the northward of St. Mary Point, between which and Stiles Landing on the northern side the distance is 2.5 miles; but the river is not accessible except at certain times of tide, and not even then except by experienced local pilots.

Buoy.—A black can is moored in 2 fathoms of water on the eastern edge of Shepody Flats, about 1 mile 345° from Grindstone Island Lighthouse.

Coast.—From Cape Chignecto, the southeastern shore of Chignecto Bay trends about north by east 6.5 miles to Squally Point, the intervening coast being steep-to and without detached dangers; but from thence as far as Apple Head Lighthouse the shore should not be neared within ½ mile.

Eatonville River.—The entrance to this river is about 1 mile southward of Squally Point and Dudgen Rock; it has a breakwater on each side of the entrance, both of which dry at half tide, and there is a bar with 13 feet on it at high water. The south breakwater has been built out into the bay in continuation of the southern bank of the river.

Eatonville River Light, fixed red, elevated 24 feet above high water, visible 6 miles, is exhibited from a square white wooden tower, 22 feet in height, 85 feet southward of the south breakwater and 132 feet back from the shore.

Eatonville.—The settlement of Eatonville, with post office, sawmill, etc., is located nearly 2 miles up the river. A tramway extends to the river mouth.

Spicer Cove, a slight and shallow indentation immediately within Squally Point, is only adapted as a temporary anchorage for small vessels. The only off-lying danger is Dudgen Rock, which lies about 400 yards northeastward of Squally Point.

Apple River Harbor is a small harbor at the mouth of Apple River, which empties into Chignecto Bay. At the entrance the depth of water is 6 fathoms and from 1¾ to 1½ fathoms inside the harbor at low water. In the vicinity at Spicer Cove the tide rises 37 feet at spring tide and 30½ feet at neap tide, giving an idea of the rise and fall of the tide in the harbor of Apple River.

Apple River Light, fixed white, elevated 64 feet above high water, visible 12 miles, is shown from a white square tower, over a dwelling, 45 feet in height, standing on Cape Capstan or Hetty Point, on the northern side of Apple River entrance.

Fog signal.—A steam foghorn is sounded. The fog-signal house, situated close eastward of the lighthouse, is a white building with a brown roof.

Shulie Light, fixed red, elevated 64 feet above high water, visible 8 miles, is exhibited from a white square wooden tower, 32 feet in height, with sloping sides, and situated on the eastern side of the entrance.

Ragged Reef Point Bell Buoy, marked "Ragged Reef Point" in white, is moored in 6 fathoms, ½ mile 282° from the extremity of Ragged Reef Point.

Joggins.—At this place there are several seams of coal, but the quality is inferior and not adapted for either steaming or domestic purposes; a branch line of railroad connects Joggins with the Intercolonial Railway.

Joggins Light, fixed red, visible 7 miles, is exhibited at an elevation of 32 feet at outer end of breakwater.

Anchorage.—The anchorage off the coal wharf at Joggins is bad and unsafe, with westerly winds, especially during the ebb.

Coast.—Although several indentations occur between Apple River and Boss Point, none are available for vessels save at certain times of tide.

There are some grindstone quarries along this coast, as well as on Grindstone Island, and at St. Mary Point good building stone is to be obtained.

Tides.—High water interval at Spicer Cove is at 11h. 25m.; mean range 32.2 feet, spring range 37 feet; at Grindstone Island 11h. 36m. mean range 35.9, spring range 41 feet.

Tidal currents.—From Cape Spencer the flood tides set to the eastward, generally parallel to the shore as far as Grindstone Island, at the average velocity of about 2 knots an hour, the ebb running in a contrary direction to the westward; several eddies are formed behind the salient points of this coast. In the vicinity of Cape Spencer the tidal current changes its direction about two hours before high and low water by the shore; but farther east, off Quaco Head, this difference is reduced to three-quarters of an hour. Offshore the current continues to run from a quarter to three-quarters of an hour after the time of high and low water.

Off Cape Spencer a rip, which is very heavy with westerly winds, is formed on the ebb; it is caused by a strong eddy sweeping round to the bay to the westward of the cape and impinging on the ebb tide at right angles. A similar rip occurs off Quaco Head, occasioned by the tide sweeping round to the bay to the southward and meeting the main currents of the flood and ebb off the lighthouse. Off Grindstone Island the tidal current runs from 2 to 4 knots an hour.

Cape Maringouin is the southern termination of a promontory dividing the northeastern arm of the Bay of Fundy into two branches, the Petitcodiac River to the west and Cumberland Basin to the east. The cape attains an elevation of 220 feet, and from it an extensive bank, formed by the débris of the two branches, extends in a southwesterly direction, the 3-fathom curve being 1.5 miles from the cape.

Maringouin Shoal, a sandy knoll covered with only 1 foot of water, lies near the southeastern edge of the above bank about 1 mile from the shore of the cape. From it the western extremity of Cape Maringouin bears 322°, Wards Point 55°, and Grindstone Island Lighthouse 4 miles 283°.

Clearing mark.—A good clearing mark on its southern side is Minudie Point (Cumberland Basin), open southward of Wards Point, bearing 48°.

Petitcodiac River.—From Grindstone Island on the west and Cape Maringouin on the east the shore trends in a general northeasterly direction for about 8 miles, where the arm of the sea is divided by Fort Folly Point and branches off into the Petitcodiac and Memramcook rivers.

The Petitcodiac River is navigable at or near high water for vessels of moderate draft for a distance of 25 miles and for a farther distance of 12 miles for small craft.

Abreast Fort Folly Point the Petitcodiac is about ¾ mile across, and from thence it trends in a general north-northwesterly direction for 15 miles to abreast the town of Moncton, where it takes a sudden bend and continues west-southwesterly for 12 miles as far as the town of Salisbury. The eastern shore of this river is moderately high and well wooded, and between the northern point of Shepody River and Cape Demoiselle, on the western shore, a narrow strip of marshy ground fringes the high land, which rises abruptly to the well-wooded Shepody Hills, the highest of which attains an elevation of 1,050 feet.

Fort Folly Point Light, fixed white, elevated 77 feet above high water, visible 14 miles, is exhibited from a white square wooden lighthouse with a red band, 35 feet in height, with a red lantern, on Fort Folly Point, at the junction of the Petitcodiac and Memramcook rivers.

McFarlane Point Light, fixed white, elevated 27 feet above high water, visible 5 miles, is exhibited from a white square tower, 27 feet high, on the edge of the marsh close northward of McFarlane Point.

Outhouse Point Light, fixed red, elevated 27 feet above high water, visible 5 miles, is exhibited from an inclosed wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white and 27 feet high, erected on the edge of the marsh at Outhouse Point opposite the town of Moncton.

Moncton, the principal town of the isthmus, has a population of 12,000. It contains 11 churches, schools, hotels, cotton mills, and manufactories, is the converging point of several railroads, and here locomotives, carriages, and rolling stock are manufactured. Fodder is exported in large quantities to Great Britain. It is the terminus of the Grand Trunk Pacific and an important station on the Intercolonial Railroad, at which the principal machine shops and offices of this line are located.

Wharves.—There are six wharves, with 20 to 25 feet of water alongside at spring tides.

Depth.—The depth of water is only 1¼ to 2 fathoms at low water in the channel. Vessels lie on the flats in soft mud at Moncton.

The bed of the river is dry at low water with the exception of a narrow channel.

There are no buoys in the river as there are no ledges or dangers.

The bore of the Petitcodiac River breaks about 3 feet in height about 3 to 3½ hours before high water, and the velocity of the bore at spring tide, Moncton, is about 8.5 knots per hour.

Maringouin Flats, on the northern side of Cape Maringouin, are covered at ordinary low water; the outer flat is about 1,400 yards long and nearly parallel to the shore, from which the outer edge is distant about ¾ mile. The water shoals gradually off the danger, which may be avoided by careful attention to the lead. The western extremity of this flat lies about 1 mile 13° from the northwestern extremity of Cape Maringouin.

Grande Anse Ledge.—The western end of this ledge is rather more than 1 mile from the eastern shore, at a distance of 4 miles from Cape Maringouin. The ledge covers at half flood, after which it becomes dangerous.

Clearing marks.—The eastern tangent of Fort Folly Point, open westward of Coles Head, bearing 350°, clears the ledge on its western side, but with only 3 to 9 feet at low water.

Middle Ground.—This danger dries for about 2.5 miles in a north and south direction, its greatest breadth being about ¼ mile; its highest point near the center is about 6 feet above low-water springs. The southern end lies 4 miles 32° from Grindstone Island, and its northern edge bears from Cape Demoiselle about 1 mile 52°.

Hopewell Cape Light, fixed white, visible 6 miles, elevated 20 feet above high water, is exhibited from a white wooden tower, square in plan, with sloping sides, lower part open, upper part inclosed, the whole 13 feet high, erected on the head of the public wharf at Hopewell Cape.

Clearing mark.—The houses on Dorchester Island, shut in by Coles Head, the latter bearing 3°, clears Middle Ground on its eastern side. By careful attention to the lead this bank can always be avoided.

Calhoun Flats.—To the northward of Cape Demoiselle the high land begins to deflect to the westward, while the low-water line continuing its northeasterly direction for nearly 2 miles forms Calhoun Flats, which at this point, where the low-water line trends quickly to the north-northwestward, dry for nearly 1,400 yards from the high-water line, with a depth of 4 fathoms at 200 yards off their outer edge.

Buoy.—A black barrel buoy is moored off the Calhoun Flats, 1.3 miles 170° from Fort Folly Point Lighthouse.

Memramcook Spit consists of long rocky ledges extending off Coles Head and must be carefully avoided; on the outer end the highest part of the spit, which uncovers during the last quarter ebb, lies 700 yards from the Coles Head shore and 1.4 miles 148° from Fort Folly Point Lighthouse.

Clearing mark.—The Indian chapel spire on the eastern shore of Petitcodiac, above Fort Folly Point, open westward of that point, bearing 324°, clears this danger on its western side; and Fort Folly Point Lighthouse, bearing 345°, leads mid-channel between Calhoun Flats and Memramcook Spit.

Tides.—High water interval at Fort Folly Point is at 11h. 39m.; mean range 39.4 feet, spring range 45 feet. In the vicinity of the point the tidal current runs at a velocity of from 3 to 4 knots an hour.

Tidal bore.—In the Petitcodiac River, from Stony Creek, 5 miles above Hillsborough, to Salisbury, a distance of about 20 miles, the rising tide breaks into a bore, the front edge at spring tides being about 3 feet in height.

After the passage of the bore the rise of tide is very rapid until high water is attained.

Directions.—When off Cape Spencer and bound to the eastward, keep close to the cape if on the ebb, and avoid the tide rip already described, by passing either inside or outside.

If bound to Minas Basin, from a position about 1 mile off Cape Spencer, steer to pass midway between Quaco Head Lighthouse and Quaco Ledge, and distant nearly 5 miles from the latter; from this position shape course to pass between Cape Chignecto and Isle Haute Lighthouse, care being taken to make allowance for the effect of the tides.

From 1 mile southward of Cape Spencer, steer to pass about 2.5 miles southward of Cape Enrage, distant 53 miles, care being taken to avoid the rocky ledge extending from the lighthouse in a southwesterly direction.

From thence shape course to pass mid-channel between Cape Maringouin and Grindstone Island. From that position steer for Gilbert Hill (271 feet) on a 14° bearing, until nearly abreast of Cape Demoiselle, when alter course for Coles Head until Fort Folly Point Lighthouse bears 342°, then steer for it on that bearing, which course will take a vessel in a least depth of 3½ fathoms; if going farther up the river, take a pilot, or a man familiar with the river.

Temporary anchorage may be obtained, in moderate weather, along the whole extent of coast between Cape Spencer and St. Mary Point, but when the winds, to which the coast is exposed, blow with any force the anchorage is bad, especially in localities where the velocity of tide is great.

There is an anchorage to the northward of Grindstone Island, between it and the mouth of Shepody River, but it is somewhat difficult of approach by a stranger; to enter it from a safe offing off Cape Enrage, steer for Grindstone Lighthouse, bearing 37°, until about 1 mile distant, when alter course to pass westward of the red buoys marking the shoals westward of Grindstone Island, and steer to pass midway between St. Mary Ledge buoy and the red buoy northwestward of Jones Ledges northwestward of Grindstone Island, and anchor in 3½ fathoms clear of the shoal ground northward of the lighthouse, with the latter bearing about 167°; the holding ground is not good.

Another anchorage to the northeast of Grindstone Island, which is frequently used, is in about 3 fathoms mud, about ½ mile northeastward from the eastern point of the island.

Vessels in moderate weather may anchor anywhere off the mouth of the Petitcodiac River, below Fort Folly Point, according to their draft, but the best anchorage is between Fort Folly Point and Stone Wharf, which is as far up the river as vessels of moderate size can lie afloat at low water. Here, in about 3 fathoms mud, vessels may anchor; but as the tidal current runs from 3 to 4 knots an hour, there is a disagreeable sea when the wind is against the current; and, if intending to stop longer than a tide, it is necessary to moor in order to avoid fouling the anchor.

Hillsborough.—The town, with a population of about 1,250, has a hotel, plaster and flour mills. Gypsum mining is carried on.

The Harbor.—Is situated on the Petitcodiac River, 5 miles from its mouth. The anchorage ground is 3 miles below the harbor, with 5 to 6 fathoms at low water. The tide, owing to the great range, rises and falls very rapidly in the river. The harbor is left dry at low tide, with the exception of about ¼ fathom in the channel.

Wharves.—There are four wharves in the harbor; the depth of water at the wharves at high water ranges from 8 to 14 feet, neap and spring tides respectively; vessels must arrive on the flood tide and load quickly or wait until the next tide to depart. There is no dry dock, but vessels can go on the beach at the end of spring tides and repair until the next high tide.

Memramcook River.—From Coles Head this river takes a northeastern trend, its western shore being of a moderate elevation, and covered with trees, while its eastern shore is partially cleared.

There is a small hole with 9 feet of water to the southwest of Dorchester Island, but even small vessels should be moored, if it be intended to remain afloat.

Three red nun buoys have been moored at the mouth of the river.

Cumberland Basin is the eastern termination of the Chignecto Bay, and receives the waters of numerous rivers. It lies on the eastern side of Cape Maringouin, and between Pecks and Boss Points the entrance is 1.4 miles across; from this position the channel is straight and navigable for a distance of 8 miles to a little beyond Woody Point on the northern shore.

Pecks Point Light, fixed white, elevated 81 feet above high water, visible 10 miles, is exhibited from a square white wooden building, 22 feet high, with a red roof, on the southeastern extremity of Pecks Point.

Fog signal.—A diaphone horn, worked by compressed air, is sounded.

The fog signal house is a rectangular white wooden building.

Buoy.—A red nun buoy is moored in 4 fathoms, about 800 yards 292° from the northwest extremity of Minudie Point.

Woody (Barnes) Point Light, fixed white, elevated 35 feet above high water, visible 11 miles, is exhibited from an inclosed wooden tower, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white and 27 feet high, erected on Woody Point.

Anchorages.—There is anchorage eastward of Pecks Point, on the northern shore of the entrance, in about 5 fathoms, mud, with Wards Point open off Pecks Point, bearing 211°, and the end of the wharf in Pecks Cove 256°, but this berth is very close to the 3-fathom curve.

Vessels may anchor anywhere between the above places, excepting during strong westerly winds, which frequently occur, when the ebb current, which attains a velocity of 4 or 5 knots an hour, causes a very disagreeable sea. It is advisable to moor at all of the anchorages, especially with southwesterly winds and an ebb current.

Anchorage may be obtained in the narrow channel, in 4 fathoms, about 1 mile above Woody Point and 800 yards off the northern shore. This is known as Sackville Anchorage, where vessels should moor, and their position be selected by means of the lead.

Above Sackville Anchorage only small vessels can lay afloat at low water, but trading craft lay aground on the mud.

Tides.—High water interval at Sackville, 11h. 46m.; mean range, 39.6 feet, spring range, 45.2 feet. On account of the large rise and fall, the velocity of the tidal current is very great.

Directions.—In running for Cumberland Basin, care must be taken on approaching the entrance to open Minudie Point, 46° to the southward of Wards Point, in order to clear Maringouin Shoal, after passing which, Wards and Pecks Points can be safely passed at a distance of not less than ¼ mile.

If intending to proceed beyond Pecks Anchorage, keep Wards Point, 223°, well open of Pecks Point, and with this bearing preserved astern a vessel will be kept in a deep-water channel to abreast of Minudie Point, off which is a red nun buoy, after which a more northerly course should be steered in order to avoid the mud bank which dries at low water and extends to a considerable distance from the southern shore.

Sackville is the port of entry, and has a population of about 4,000. It contains hotels, churches, schools, mills, factories, and foundries.

It has connection by the Intercolonial Railway with all points, and telegraph communication.

There are two wharves in the harbor, one with 22 feet water, and one with 18 feet at high water. A railroad spur, about ¼ mile in length from main line, runs on one wharf.

Amherst Basin—Range lights.—Two fixed red range lights are exhibited, each from a white square wooden tower, with sloping sides, 688 feet 43° 20′ apart, erected near the northwestern corner of Amherst Basin.

The front light is elevated 20 feet above high water, and visible 6 miles, the lighthouse being 22 feet high.

The rear light is elevated 40 feet above high water, and visible 4 miles, the lighthouse being 42 feet high.

These lights in ranges 43° 20′, lead through the channel nearly to the wharf.

Buoys.—Four spar buoys and one red conical buoy mark the channel to Amherst; three of the spar buoys are painted black, and one red; they are maintained during the season of navigation, but are taken up on the appearance of ice.

The conical buoy is moored near the mouth of the Aulac River.

Amherst, in Cumberland Basin, at the extreme eastern end of the Bay of Fundy, has a population of about 9,000 persons, and contains a hotel, churches, and schools; it is surrounded by a farming district, and is the center of the lumber trade. Iron factories, foundries, machine shops, saw and various other mills are established there; its chief shipments are cars, engines, boilers, farm produce, and lumber. It is connected by railroad and telegraph lines with the Dominion System.

Amherst is a port of entry for vessels. Vessels enter this harbor only during a rising tide or high tide. When the tide falls vessels lie on the mud bottom.

Wharves.—There are two wharves in the harbor; railroad siding on each wharf; one shed and hoisting engine; depth of water at the wharves 25 feet at high water. There are no docks for repairs and no anchorage for vessels to lie afloat at low tide.

Amherst Point Light, fixed white, elevated 26 feet above high water, visible 6 miles, is exhibited from a pole on the Government Wharf at the edge of the marsh, about 3.4 miles westward of Amherst.

Minudie Wharf Light, fixed white, elevated 26 feet above high water, visible 6 miles, is shown from a pole on the outer end of Minudie Wharf, about 2¾ miles southwestward of the above light.

CHAPTER III.

BAY OF FUNDY—SOUTHEAST SHORE—BARRINGTON BAY TO MINAS BASIN.

Barrington Bay is a spacious inlet, having for its points of entrance Baccaro Point on the east and Cape Sable on the west. Near its head is an anchorage accessible by two channels, one east and one west of Cape Sable Island, which affords a partial protection to the anchorage. The western channel must be considered impracticable to a stranger, in consequence of extensive flats and numerous dangers which narrow the channel and render the navigation always difficult and dangerous.

Town.—At the head of the inlet, and extending a considerable distance along the shore, is the straggling Township of Barrington with a population of about 1,800. The town has saw and wooden mills, factories, etc. Fishing is the chief industry.

The town is connected by railroad and telegraph with the Canadian systems.

Barrington East Bay Light Vessel.—A fixed white light, elevated 35 feet above the sea, and a fixed red light, 15 feet vertically below it, visible, respectively, 11 and 6 miles, are exhibited from the foremast of a schooner-rigged light vessel, painted red, and marked "Barrington No. 17" on both sides, moored in 6 fathoms about 800 yards eastward of Wesses Ledge, Barrington Bay, and about 6¼ miles 313° from Baccaro Lighthouse.

Fog signal.—A hand foghorn is sounded in answer to vessels.

By referring to the chart, the position of the various shoals in Barrington Bay will be seen, and how best to avoid them under the existing circumstances.

East channel.—Vessels can approach on either side of Bantam Rocks, but if passing between them and Baccaro Point, where the channel is but 800 yards wide, vessels will have to do so by bearings of the land, as no range marks are available. After passing clear of Shot Pouch Patch, course can be shaped up the bay to pass mid-channel between the shoals extending from Clam Point and those off the mainland. Lighthouse Rock should then be seen nearly in range with the light vessel, and by steering for it on a 311° bearing the shoal water will be avoided, and after passing the light vessel anchorage will be found in 6 fathoms, with North East Point of Cape Sable Island bearing 249°.

Should the light vessel not be in position when approaching the anchorage, care must be taken to avoid the extensive sand flats which surround Beach Point. In this case the best course to pursue, when steering for Lighthouse Rock, will be to favor slightly on the island shore, toward which the water shoals gradually, and keep in about 5 fathoms.

There is room for a vessel to work into this anchorage by the eastern passage, and by paying careful attention it may be done without a pilot.

Buoys.—A red wooden spar buoy is moored on the western edge of sand flats, ¾ mile 262° from the southwestern extremity of Beach Point.

A black wooden spar buoy is moored on the eastern edge of mud flats, 1 mile 324° from the same extremity.

West channel.—The channel into Barrington Bay, westward of Cape Sable, known as Barrington Passage, is of such an intricate and dangerous character that no stranger would be justified in attempting it without the aid of a good pilot. Many of the dangers are marked by spar buoys, painted red or black in accordance with the uniform system.

Anchorage.—The anchorage is in about 6 fathoms about 600 yards northward of the light vessel. A heavy sea sets in with gales from between south and southeast rendering it unsafe.

Stony Island Shoal.—Consists of a 3½ to 4¾ fathoms, rocky patch, it lies about 2 miles northeastward of White Knoll Ledge, at the entrance to Barrington Bay and about midway between Baccaro Point and Donald Head.

Donald Shoal.—From 3½ to 4¾ fathoms, rocky patches, lies off Donald Head and about midway between White Knoll Ledge and Stony Island Shoal.

White Knoll Ledge Buoy.—A black can buoy is moored in about 8 fathoms ¼ mile 117° from White Knoll Ledge, a shoal with less than 1 fathom on it on the western side of the entrance to Barrington Bay.

Congress Shoal Bell Buoy.—A black can bell buoy, with "Congress Shoal" painted in white letters, is moored in 5 fathoms of water on the northern side of Congress Shoal, a rocky patch with a depth of 2½ fathoms, situated about 1,400 yards eastward of Bulls Head, Cape Sable Island.

Cape Sable Island, about 7½ miles long and of an irregular form, is separated from the mainland, on its northern side, by a channel only 700 yards wide. The island is thickly wooded, singularly flat, and surrounded by dangers especially on its southern and western sides.

Cape Sable, at the southern end of the island, is also the southwestern extremity of the Province of Nova Scotia, and is the outer end of a small island whose hillocks of blown sand, varying from 15 to 30 feet in height, are continually shifted by hard gales.

Cape Sable Light, flashing white, elevated 53 feet above high water, visible 12 miles, is exhibited from an octagonal white lighthouse, 50 feet in height, on Cape Sable.

Fog signal.—A diaphone horn, elevated 40 feet above high water, and worked by compressed air, is on the southern point of the cape.

A small lifeboat is in charge of the lighthouse keeper at Cape Sable.

Radio.—There is a radio station at Cape Sable Lighthouse, with which vessels can communicate; the office is open both day and night, the call letters being **VCU.**

West Head is the western extremity of Cape Sable Island.

West Head Light, fixed white, elevated 42 feet above high water, visible 11 miles, is exhibited from a white square wooden tower, 36 feet in height, near the extremity of the head.

Fog signal.—A hand foghorn is sounded.

Columbia Rock, a small pinnacle with 1 fathom water, lies 1 mile 144° from Cape Sable Lighthouse. There is a rock with 2½ fathoms on it ½ mile northeastward of Columbia Rock. Beyond these rocks, 1,200 yards in a southerly direction, are the continuations of the rocky ledges which extend from Cape Sable; over and outside these are heavy tide-rips during the strength of the tides, caused by the current rushing over the uneven rocky bottom.

Horse Race, a rocky patch covered with 2 fathoms, lies ¼ mile within Columbia Rock, and causes a heavy tide rip.

S. W. Ledge, 1.7 miles southwestward of Cape Sable, is about ½ mile in length. Near the northern end are two rocks which uncover ½ and ¾ fathoms, respectively, at low-water spring tides, and ¼ mile south-southwestward from them and 1.8 miles 236° from Cape Sable Lighthouse is a rock on which the sea generally breaks heavily; this rock nearly uncovers at low-water spring tides, and southwestward of it, for the distance of nearly 1 mile in a seaward direction, heavy tide rips rush over the rocky tail of the ledge, although the depth upon it is 6 or 7 fathoms.

Light and whistle buoy.—A red cylindrical buoy, marked "S. W. Ledge" in white, and surmounted by a pyramidal frame supporting a whistle and lantern, from which an occulting red light, eclipsed at short intervals, is exhibited, is moored 4 miles 219° from Cape Sable Lighthouse.

Cornwall Rock, with a least depth of 2¾ fathoms, lies 3 miles 260° from Cape Sable Lighthouse.

A red conical buoy, marked "Cornwall Rock" in white letters, is moored 125 yards 255° from the above rock.

Green Island Ledge is 2 miles northward of S. W. Ledge; it has less than 1 fathom on it and a patch of 4¾ fathoms 800 yards outside it.

Green Island Bank (Cooks Ledge), about ¾ mile westward of Green Island, in the approach to Clarke Harbor, has a depth of 1½ fathoms over it.

Green Island, 3 miles northwestward of Cape Sable Light is 20 feet high, and connected with Fish Island by a shoal, on which are numerous rocks.

Hospital Ledge Bell Buoy.—A red buoy, surmounted by a bell, is moored in 8 fathoms of water, about ½ mile northwestward of Hospital Ledge, at the entrance to Clarke Harbor, 1 mile 231° from West Head Lighthouse.

Buoy.—A red nun buoy is moored 1,667 yards 292° from Swim Point.

Clarke Harbor is situated on the southwest coast of Cape Sable Island, and appears to be difficult of access, but the dangers are buoyed.

The harbor is divided into what is known as Upper and Lower Clarke Harbor; the upper harbor is nearest the entrance.

Southward of Upper Clarke Harbor, about ¾ mile, is Lower Clarke Harbor; the channel leading to it is smooth, with a depth of water of from 20 to 30 feet at high water.

Entrance to the harbor is from the northwest; at the entrance there is a piece of shoal ground and channels on both sides of it leading into the harbor, with a depth of about 30 feet at high water. The channel is quite straight, the depth of water about the same as at the entrance. The shoals and ledges are marked by can and spar buoys.

Breakwater.—Inside the entrance is a breakwater on the northern side of the harbor; the length is about 800 feet.

The town contains churches, schools, and factories. The chief industry is fishing. The population is about 1,500.

Wharves.—In the Upper Harbor there are four wharves, ranging in length from 350 to 400 feet, and with depths of 13 to 16 feet at high water; in the Lower Harbor are three wharves, with lengths varying from 150 to 250 feet, and depths alongside at high water of 18 to 20 feet.

There are no docks for repairing vessels.

Ice.—The harbor is usually free from ice in winter, but occasionally shipping may be interfered with from this cause.

Anchorage.—The lower harbor is well sheltered with good holding ground, and is considered safer than the upper harbor. The bottom is mud and quite level.

Steamers make trips from Halifax and St. John, and communication is kept up with other ports along the shore.

Tides—Currents.—High water interval at Cape Sable is at 8h. 42m.; mean range 9.1 feet spring range 11 feet. Strong northwesterly winds lower the surface of the water, and southeasterly winds have a contrary effect, although the times of high and low water are not materially affected by either.

At Brazil Rock the current turns about half an hour before high and low water at Cape Sable, toward which the flood runs about 2 knots an hour, but seaward of Brazil Rock the velocity diminishes in proportion as the distance from the shore increases, while over the rock the tides rush with great rapidity and create a considerable rip.

Inshore around Baccaro Point and over Bantam Rocks the flood sets strong, and from the point trends toward Stony Island (on the eastern shore of Cape Sable Island), where the current divides, the northern branch setting round Clam and Northeast Points, and thence to the southward along shore toward Cape Sable; while the southern branch trends along the eastern shore of Cape Sable Island toward the same point.

Outside Bantam Rocks the flood sets toward Cape Sable, round which, for a distance of 3 miles offshore, it attains a velocity of fully 4 knots an hour during its strength. After rounding the cape the flood current sets toward Seal Island, passing it and through the various channels to the northward between it and Tusket Island in a general northwest direction, at velocities varying from about 2.3 to 4 knots an hour. The flood assumes a more northerly trend along the main shore. The direction of the ebb current is nearly opposite to that of the flood and runs with equal velocity.

Seal Island, about 17 miles westward of Cape Sable, is 2¼ miles long, low, thickly wooded, and the most offlying, in a southerly direction, of a cluster of islands extending from Frenchman Point. The island is surrounded on its eastern, southern, and western sides by shoals of a very dangerous description and when navigating in their vicinity great prudence is required.

A lifeboat is stationed on the eastern side of Seal Island.

Anchorage.—The anchorage is about 1 mile 45° from Seal Island Lighthouse, in 6 fathoms, sand bottom.

Seal Island Light, group flashing white, elevated 102 feet above high water, visible 16 miles, exhibited from an octagonal wooden lighthouse, 67 feet high, painted white, with two red horizontal bands, erected about 250 yards from the southern point of the island.

Fog signal.—A steam whistle in close proximity to Seal Island Lighthouse is sounded.

The fog signal house is a long, low, rectangular building, painted white, with a red roof, situated on the beach at the southern extremity of the island.

Purdy Rock, 2.3 miles 103° from Seal Island Lighthouse, is of small extent, with 2¼ fathoms on it and deep water all round, shows a rip during the strength of the tide and breaks in heavy weather.

Blonde Rock, 3.5 miles 159° from Seal Island Lighthouse, is about ¼ mile long, and a small portion near the middle uncovers about 2 feet at low water springs.

About 1 mile westward of Blonde Rock is a heavy breaking rip during the strength of the tidal current, but not less than 9 fathoms water has been found on it.

Light and whistle buoy.—A red cylindrical buoy, marked "Blonde rock" in white, surmounted by a pyramidal frame supporting a whistle and lantern, from which an occulting white light, eclipsed at short intervals, is exhibited, is moored, in 13 fathoms, 2 miles 199° from Blonde Rock.

Elbow Shoal, about 1 mile long, within the 5-fathom curve, has on its northern end a depth of 2¼ fathoms and 2½ fathoms near its southern extremity. Elbow Rock, the shoalest part, is covered by about 1 fathom and occupies a more central position. It lies about 1.4 miles 176° from Seal Island Lighthouse and the eastern tangent of Seal Island is just in line with the rock on its southern point.

Zetland Shoal, about 1¾ miles 26° from Seal Island Lighthouse, has 21 feet water over it. The shoal breaks in heavy weather and is marked by a rip during the strength of the tide.

Devils Limb, about 1½ miles 294° from Seal Island Lighthouse, is a small rocky islet, 8 feet above high-water springs. About ¼ mile southward of the islet is a rocky shoal, named Loch Foyne, which uncovers at low-water springs.

Limbs Limb Shoal, 1,200 yards 359° from Devils Limb, shows one hour after high water.

There is a passage between the Limb Shoals and Seal Island for vessels of moderate draft, but it should only be attempted by those well acquainted with the locality.

There are temporary anchorages on both sides of Seal Island, but as the bottom is rocky, tides strong and irregular, and anchors are liable to foul, these anchorages should never be used unless the wind be off the island.

Mud Islands, situated 3 miles northeastward of Seal Island, consist of four small islands, 10 to 25 feet high, named Noddy, Mud, Round, and Flat; of these Mud and Round Islands may be approached within a moderate distance on their eastern side, but Noddy Island should not be closed within ½ mile.

From the northern end of Flat Island a shoal extends 700 yards in a northeasterly direction, terminating in a rock with only about 1¼ fathoms water, over which the tide causes a considerable rip.

Between Seal and Noddy Islands there is a safe deep-water channel, but one-third of the way across from Noddy Island there is a shoal with 5¼ fathoms water on it.

The flood current sets strong through this channel, at a velocity of nearly 4 knots an hour, in a northwesterly direction; the ebb running to the southeastward attains the same velocity. When using the channel in thick weather it is better to keep over toward Seal Island Shore, but as a rule, during fogs, it is advisable to pass southward of Blonde Rock.

Clearing mark.—If from the southward, with Blonde Rock in sight, Flat Island seen just open east of Seal Island, will lead between Blonde Rock and Elbow Shoal.

Temporary anchorage may be obtained on the eastern side of Mud Island in about 8 fathoms, with the northeast end of Mud Island in range with the middle of Round Island and the southeast end of Mud Island in range with the middle of Noddy Island.

A vessel may also anchor on the northwest side of Flat Island, but is must be distinctly understood that the anchorages around these islands are not recommended, and should only be resorted to as a matter of convenience in fine weather or when driven by necessity during bad weather.

Black Ledge, nearly 1 mile westward of Mud Island, is always visible except at high-water springs, when its position is marked by a breaker. It lies with the southern end of Flat Island, bearing 7°, distant 1.5 miles, and the center of Noddy Island bearing 125° 1.3 miles.

Between Black Ledge and Flat Island the ground is foul.

Mud Island Shoal, about 2.5 miles westward of Mud Island, has 4 fathoms on its shoalest part, but it shows a rip during the strength of the tide, and breaks in very heavy weather.

The shoal, which is ¼ mile long, should be avoided by vessels of large draft, because, on account of the bottom being irregular, it is probable the least water has not been obtained. From the depth of 4 fathoms on the eastern end of the shoal the southern end of Mud Island bears 92°, distant 2¼ miles, and Seal Island Lighthouse is seen just open westward of Division Point, bearing 166°, distant nearly 5 miles.

In steering between Noddy and Seal Islands a vessel should pass southward of this shoal.

Soldier Ledge is a dangerous patch of rocks about 2½ miles 322° from the southern point of Flat Island; the passage between, though available, is not recommended, as it is possible that shoals may exist in the parts only partially examined. A portion of the ledge, about ¼ mile long, uncovers about two hours after high water and is very dangerous, but it generally breaks when covered.

The southeast extremity of Frenchman Island, seen open northward of Bald Tusket Island, bearing 22°, leads westward of Soldier Ledge.

Bon Portage Island Light, occulting white, elevated 46 feet above high water, visible 12 miles, is exhibited from a white square wooden lighthouse, 28 feet in height, on the southern point of Bon Portage Island, 6½ miles northwestward of Cape Sable Lighthouse.

Fog signal.—A hand foghorn is sounded.

Whistle buoy.—A red whistle buoy, marked "Bon Portage" in white, is moored in 8 fathoms, 1 mile 184° from Bon Portage Lighthouse.

Stoddart Island Light, fixed red, elevated 22 feet above high water, visible 9 miles, is exhibited from a small white square lighthouse, 21 feet in height, on the northwestern point of Stoddart Island, Shag Harbor.

Fog signal.—A hand foghorn is sounded in answer to vessels.

Stoddart Cove lies just within the northern point of Stoddart Island; the cove, in which there is a depth of 2¼ fathoms, affords good anchorage in all weather for small vessels. In entering, keep on the Stoddart Island Shore, in order to avoid a rock awash at low-water springs, about 200 yards off the western point of Prospect Island.

Shag Harbor, between Bon Portage Island and the mainland, though open to the southward, is somewhat sheltered from the heavy sea by the ledges off Cape Sable. Temporary anchorage may be had westward of Prospect Island, in about 8 fathoms, on the western tangents of Green and Stoddard Islands and the Baptist Chapel at Shag Harbor Village, in range with the northern end of Prospect Island, bearing 50°. This position is to the eastward and beyond the influence of the strength of the tidal currents, but as the holding ground is not good, a long scope of cable should be given. The best holding ground is said to be northward of Conquerall Hill.

In entering Shag Harbor with the flood, a wide berth should be given to the southern point of Bon Portage Island, as the tide sets directly for it with a velocity of 4 miles an hour.

Cockerwit Passage.—Cockerwit Passage can only be used by vessels drawing 8 to 9 feet water.

At the southern entrance of Cockerwit or Wood Harbor, and between it and the Mutton Islands, there is good anchorage in 5 to 5½ fathoms mud. In the passage to this anchorage there is a rock, known as Barrel Rock, about 800 yards eastward of Stony Island.

Clearing mark.—A house standing on the northern end of Stoddart Island, seen just open eastward of a detached rock off Prospect Point, leads eastward of the rock.

The passage between Bon Portage Island and Robinsons Ball station can only be used by small vessels.

Buoys.—A red conical buoy marks the northern end of Bon Portage Island North Bar.

A black can buoy marks the southern end of Robinsons Ball South Bar.

A black can buoy marks the eastern side of Barrel Rock, which lies about 250 yards 63° from Stony Island.

Bell buoy.—A bell buoy, painted black and white in vertical stripes with the name "Cockerwit" on the deck is moored in 7 fathoms of water, off the western entrance to Cockerwit Passage, between Robinsons Ball South Bar and Bon Portage Island North Bar.

Lower Wood Harbor Light, fixed red, elevated 27 feet above high water, visible 8 miles, is exhibited from a white square wooden building, 28 feet in height, with sloping sides, with red lantern, on Big Ledge (covered at high water), at Lower Wood Harbor.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

The channel to Upper Wood Harbor has a rocky bar across its entrance, over which the water falls at three-quarters ebb; the harbor can only be entered by vessels of about 6 feet draft.

St. John Island Beacon.—An iron mast, surmounted by a spherical cage, has been placed on the extremity of the spit extending from the northeastern end of St. John Island. Vessels must pass northeastward of this beacon.

On the northern side of St. John Island, at the northern entrance of Cockerwit Passage, shelter can be obtained during southeast gales.

St. John Ledge, a dangerous shoal, ¾ mile in extent, has near its center a patch, situated 1.5 miles 184° from the southern point of St. John Island, which generally breaks and shows except at high-water spring tides. The tidal current sets directly over this ledge, sometimes very strongly.

Clearing mark.—Beach Point Lighthouse, 19° 15′, open to the westward of St. John Island, leads westward of the ledge.

Buoys.—A red conical buoy, marked "John Ledge" in white, is moored in 9 fathoms ½ mile 330° from the middle of the ledge.

Light and whistle buoy.—A cylindrical buoy, painted in black and white vertical stripes, marked "Pubnico," and surmounted by a pyramidal steel frame carrying a whistle and lantern, from which an occulting white light, eclipsed at short intervals, is exhibited, is moored in 15 fathoms about 2.8 miles 280° from the center of St. John Ledge, and 6 miles 218° from Beach Point Lighthouse.

Pubnico Harbor.—Pubnico Harbor, extending nearly 7 miles in a north-northeasterly direction, is formed on its western side by a peninsula, the southern extremity of which is St. Ann Point, off which shoal water extends 600 yards. It is navigable for small vessels nearly to the head, but about 2 miles from the entrance, between St. Ann and Beach Points, the channel is encumbered with shoals; below these shoals the harbor affords safe anchorage to vessels of large draft, and, from the comparative absence of dangers at the entrance, is accessible at all times.

The harbor is in 3 sections, divided as follows: Pubnico, Middle Pubnico, and Lower East Pubnico.

Wharves.—At lower East Pubnico there are two wharves, one on the eastern side and one the western, where light-draft vessels load and unload. Two wharves at Middle Harbor, one on the eastern and one on the western side.

Beach Point Light, occulting white, elevated 41 feet above high water, visible 11 miles, is exhibited from a white square wooden tower, 40 feet in height, with red lantern, situated near the extremity of Beach Point, 120 yards from low-water mark, on the eastern side of the entrance to Pubnico Harbor.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

Buoys.—A bell buoy, painted black, marked "Pubnico" in white, is moored in 6 fathoms, 800 yards 185°, from St. Ann Point.

Pubnico Ledge, which uncovers at low water, extends 800 yards from the western shore at the entrance; its extremity is marked by a red can buoy, lying 600 yards northward from Beach Point Lighthouse.

Tides.—High water interval at Pubnico Harbor is 9h. 11m.; mean range 10.5 feet, spring range 12 feet.

Directions.—On approaching Pubnico Harbor, after passing St. John Island, bring Beach Point Lighthouse to bear 38°, bearing in mind that shoal water (marked by a bell buoy) extends off St. Ann Point to the distance of ½ mile; pass 200 yards from the lighthouse, and steer to pass close on the eastern side of the buoy marking the outer extremity of Pubnico Ledge, or if this buoy is not in position, by bearing of Beach Point Lighthouse. After passing the buoy steer for the church, a conspicuous object on the western shore, in order to clear a shoal on the eastern shore with 11 feet water (but on which it is possible there may be a less depth, as the bottom is sharp and irregular), and having passed this, steer by bearings of the lighthouse astern, and anchor in 9 or 10 fathoms, mud, abreast the wharves near Meres House, inclining a little to the western side of the harbor.

In the event of the buoy not being in position, a good mark for clearing Pubnico Ledge is the point southward of Beach Point, seen over the high-water mark of Beach Point; this mark will also clear, but lead rather close to, the 2-fathom ledge on the eastern side of the harbor.

Vessels bound to Pubnico should be careful to keep well outside St. John Ledge, as the current sets directly over it, sometimes very strong.

Water.—A fresh-water spring, close to the southern wharf (Meres House), affords about 4 tons of good water daily.

St. Ann Shoal, ¼ mile long, with 2½ fathoms on it; lies 1.8 miles 297° from St. Ann Point, and upward of 1.5 miles 204° from the southern Twin Island.

Nearly abreast St. Ann Shoal is a rocky spit with 2¼ fathoms water, extending ½ mile from the main shore. The passage between these dangers is deep and ½ mile broad.

Clearing marks.—From the spit the western ends of Abbot and the southern Twin Islands are in range, and by keeping the lighthouse in Abbot Harbor open westward of the southern Twin Island, bearing 7°, the spit will be cleared at a distance of 400 yards. The Twin Islands in range bearing 13° lead in mid-channel between the spit and St. Ann Shoal.

Twin Islands, about ¼ mile from the shore and the same distance apart are very small, with shoal water around them, leaving only a narrow, 5-fathom channel between them.

Shoals.—Off the northern Twin are two small detached shoals, one with 2½ fathoms, bearing 286° 700 yards, and the other with about 1¼ fathoms water 336°, nearly ½ mile.

Abbot Harbor, with a depth of 3¼ fathoms, is formed by the narrow channel between Abbot Island and the main shore, and although only 200 yards across at its entrance, is well adapted for vessels of small draft, being easy of access and completely sheltered from all winds.

Abbot Harbor Light, fixed white, elevated 40 feet above high water, visible 8 miles, is exhibited from a mast 28 feet high on the eastern side of Abbot Harbor.

Directions.—Approaching from the southward, the western end of Abbot Island in range with a point on the mainland within Bramble Island, bearing 14°, leads westward of St. Ann Shoal and of the outer shoal off Twin Islands; when abreast Stony Island, bearing 94°, steer 47° to avoid the shoal water extending about 400 yards to the southward of Abbot Island until the northern point of the harbor opens out eastward of Abbot Island, thence round the southeastern point of the island at a distance of about 100 yards and anchor in about 3½ fathoms midway between the island and the main shore.

Argyle.—The scattered township of Argyle lies on the mainland to the northward of Abbot Island. Off its shores are several anchorages, but the channels leading to them are too intricate to be entered without a pilot.

White Head Island, the southeasternmost of the numerous islands in the upper part of the bay, between Abbot Harbor and Frenchman Point, is situated 5 miles 327° from St. Ann Point; the island is about 1 mile in length and conspicuous by earthy cliffs of a reddish color, 72 feet high on its southward side.

Shoals.—A patch with 4¼ fathoms over it lies 1,200 yards 182° from White Head Island Lighthouse; between this and St. Ann Shoal there are several others of the same depth situated about 1¼ miles westward of the Twin Islands.

White Head Island Light, fixed red and white, elevated 115 feet above high water, showing red to seaward and white toward Argyle Harbor, visible 12 miles, is exhibited from a white square wooden tower, 28 feet in height, attached to the keeper's dwelling, on the southern point of White Head Island.

White Head Ledge, about ¼ mile in length, uncovers near its center at low-water springs, situated 1,600 yards 79° from the lighthouse; after half ebb the position of the shoal is marked by kelp.

West Shoal, about 700 yards long, has only 2 fathoms water near its southern end, and from this part of the shoal the southern end of White Head Island bears about ½ mile 117°.

Jones Ledge, nearly ½ mile long, dries near its center, from which part the southern end of Jones Island bears 350° 700 yards.

Gull Island, a low island with vegetation, situated 2 miles westward of White Head Island, should not be approached on its southern and eastern sides within ½ mile. From its northern end a long, narrow, stony bar, which dries at low water, extends 1,400 yards 347°. A patch with 3½ fathoms lies ¾ mile 100° from the southern end of Gull Island.

A beacon consisting of a square cribwork pier with sloping sides, surmounted by a pole carrying two crossed rectangular slatwork daymarks, the whole painted white, marks the eastern extremity of the ledge extending eastward from Gull Island. The top of the beacon is 30 feet above high water.

Midway between Gull and Eastern Bar Islands is a rocky patch 400 yards long, having only 4 feet water on its southern end.

Gull Ledge lies about 2 miles 175° from Gull Island, and has only about ¼ fathom water on its shoalest part, from which the large barn on Sheep Island is in range with the western high-water mark of Gull Island.

A red conical buoy marked "Gull Ledge" in white letters is moored in 7 fathoms 300 yards southward of Gull Ledge.

Southwest Shoal is small, covered with 2½ fathoms, and having deep water close to. From this shoal the western end of Gull Island bears 1 mile 69°. A patch covered with 3½ fathoms lies ¾ mile 145° from Southwest Shoal.

A can buoy, painted red and black in horizontal bands and marked "Southwest Shoal" in white letters on the top, is moored 200 yards 179° from the southern end of Southwest Shoal.

Pumpkin Ledge, ½ mile eastward of Pumpkin Island, has ¼ fathom on it at low water and is marked by kelp at half tide.

Lear Island, 60 feet high, is 2 miles northeastward of White Head Island.

Jones Anchorage—Directions.—In case of emergency Jones anchorage may be rendered available by proceeding as follows: Steer for White Head Island on a 5° bearing and keep along its eastern shore with the center of Lear Island bearing 355°. This course will lead between White Head Island and Ledge and also nearly in mid-channel between Pumpkin Island and Pumpkin Ledge. The latter has only 2 feet water on it, but is marked at half tide by kelp.

When abreast the northern end of Pumpkin Island, or with the western ends of Thrum and Hog Islands in range, bearing 336°, alter course for the eastern tangent of Jones Island and steer along its eastern shore at a distance of about 300 yards. Good anchorage will be found in about 6 fathoms, mud, with the center of Ram Island in range with the southern end of Lear Island.

To pass westward of White Head Island, bring the eastern end of Thrum Island in range with the western end of Pumpkin Island, bearing 10°.

This mark will lead midway between White Head Island and West Shoal. After passing along the western side of Pumpkin Island (the depth is only 3½ fathoms at low water) steer for the channel between Thrum and Jones Islands and proceed as before directed.

Big Fish Island Light, group occulting white, visible 12 miles, is exhibited from a lantern on roof of a white square wooden dwelling on the southwestern end of Big Fish Island, at the entrance of Tusket River.

Pioneer Rock, a small isolated rock, with 2¾ fathoms over it and 4 fathoms close around, lies nearly in mid-channel of the entrance to Tusket River and about 775 yards 100° from Big Fish Island Light.

house. The channel westward of the rock is slightly wider than that on its eastern side.

A red buoy is moored close to the rock.

Big Fish Rocks consist of a small cluster of rocks which uncover at low water, about 600 yards 319° from the southwestern point of Big Fish Island.

There is 3 fathoms water in the channel between Big Fish Rocks and Big Fish Island.

Tucker Island Shoal—Buoy.—A shoal with 2¼ fathoms on its extremity extends 900 yards northward from Tucker Island. A red conical buoy is moored in 4½ fathoms off its northern end.

Tusket River and Wedgeport.—At the mouth of the river there are islands and outlying dangers.

The mud flats are bare at low tide as far out as the channel. There are also mooring places along the river and buoys to mark the dangers and indicate the channel.

Lumber is exported from different points on the river and from Wedgeport; vessels carrying coal, agricultural products, and some general cargo enter.

There is a Government wharf at Wedgeport.

Stakes.—Thirty-five stakes have been placed to mark the channel in Goose Bay from Wedge Point to the public wharf at Wedgeport.

Telegraph.—There is a telegraph station at Tusket.

Tides.—It is high water, full and change, in Tusket River (Pinch Gut Island) at 9h. 33m.; springs rise 13 feet and neaps 10 feet.

Directions—Eastern Channel.—Tusket River should not be attempted at low water by vessels over 15 feet draft; it affords safe anchorage, but the two approaches, being narrow and beset with dangers, require great caution when entering.

If from the southward, the western side of Gull Ledge may be cleared by bringing the large barn on Sheep Island, bearing 358°, well open of the western end of Gull Island, remembering that when it is in range with the western end of Gull Island it leads over the shoalest part of the ledge; the same barn just open to the eastern end of Gull Island leads to the eastward of the ledge. After passing the ledge keep to the northeast until Big Fish Island Lighthouse is in range 311° with the northern end of Eastern Bar Island, and by steering this course the shoal water off Gull Island and the half-tide rock off Sheep Island will be avoided. On nearing Eastern Bar Island, when the western end of Sheep Island bears 342°, keep carefully on this course and steer through the narrows between Wilson Point and Eastern Bar Island as far as the southern point of Tucker Island, taking care to avoid a 3-fathom spot 800 yards off the western shore of Sheep Island, when alter course to bring Wilson Point astern bearing 147°, and anchor in about 6 fathoms, mud, off the western end of Sheep Island.

Western Channel directions.—After passing Gull Ledge, open Tucker Island westward of Inner Fish Island, bearing 1°, which is a good mark for clearing the S. W. Shoal, and, after passing it, keep to the northwestward until Big Fish Island Lighthouse bears 357°, when continue on that course until the southern end of Eastern Bar and White Head Islands are in range. Then steer northward for a short distance, until the eastern end of Mike Island is apparently just in range with the western end of Tucker Island, bearing 13°; steer with these marks in range, passing 200 yards westward of Big Fish Island, until Little Fish Island apparently just touches Big Fish Island, when, by keeping these marks astern, a vessel will clear Big Fish Rocks on their eastern side and avoid the shoal ground northward of Big Fish Island.

When Inner Fish Island is seen open eastward of Big Fish Island, alter course for Pinch Gut Island, bearing 10°, which should lead in deep water between Tucker Island and its ledge on the western side of the channel, and when Wilson Point appears in range with the northern side of Tucker Island, a vessel will be clear of the shoal ground north of Tucker Island, and might steer to the eastward around the red conical buoy, marking this shoal, and anchor as before directed off the eastern end of Sheep Island. Vessels should not proceed beyond this anchorage without local knowledge, as the channel is intricate and tide rapid.

In the narrows abreast Plymouth Settlement the current during the strength of springs, runs about 5 knots, and in the vicinity of Pinch Gut Island 2 knots an hour.

Old Woman Rock, which uncovers at 2 hours' ebb, is situated near the center of a shoal about 800 yards long north and south, and is the most southeasterly of the dangers off Frenchman Point, from which it is 1.3 miles.

A red buoy is moored, in 3½ fathoms, about 400 yards southward of Old Woman Rock.

Clearing marks.—Big Fish Island Lighthouse, bearing 5°, leads eastward of this danger, as well as of all the shoal patches and ledges, on the western shore of the western entrance to Tusket River; the southern point of Spectacle Island, open off the southern point of Peases Island, bearing 265° 30′, leads southward of Old Woman Rock.

Goose Bay and approaches—Buoys.—The following buoys are moored to mark the channel from Frenchman Point to Wedge Point in the approach to Goose Bay:

A red spar buoy off Frenchman Point.

A black spar buoy on the southeast side of Sylvin Ledge.

A black spar buoy on the southern side of Lobster Island North East Ledge.

A red spar buoy off Snipe Reef North Bar.

A black spar buoy off Green Island Ledge.

A red spar buoy off Western Bar Island North Bar.

A red spar buoy off Wedge Point.

A black spar buoy on the southern side of Goose Bay Ledges.

Fairway Bell Buoy.—A bell buoy, painted in black and white vertical stripes, marked "Peases Id. Fy." in white, is moored in 9½ fathoms, 2 miles 106° from Peases Island Lighthouse, in the southern fairway to Schooner or Ellenwood Passage, between Old Man and Old Woman Rocks.

Old Man, 2 miles southwestward of the Old Woman and 1.7 miles 172° from Frenchman Point, is the largest of a small cluster of rocks which uncover about an hour before low-water springs.

A black can buoy, marked "Old Man" in white, is moored in 5 fathoms, 200 yards eastward from the rock.

Clearing marks.—Owls Head, 323° 30′, open eastward of Allen Island, leads eastward of Old Man.

Bald Tusket Island, about 400 yards in extent, 50 feet high, and bare of trees, is the most offlying and conspicuous of the Husket Group; it should not be approached on its northern, western, and southern sides nearer than 700 yards in consequence of shoal water.

Little Bald Tusket Shoal, with 1½ fathoms water, lies with the eastern end of Marks Island apparently in range with the southern end of Peases Island bearing 311°, and the northern end of Inner Bald Island, distant about ½ mile 230°.

Harriet Ledge occupies a central position on a rocky shoal ¾ mile in length; the ledge is about 200 yards long, covers at a third flood, and during the run of the tide shows a considerable tide rip.

From the ledge Holmes Island is seen just open eastward of Spectacle Island, and the southern point of Peases Island apparently in range with the northern point of Little Half Bald Island.

Cleopatra Shoal, a dangerous detached shoal, 400 yards long, with 2 fathoms on its shoalest part, is marked at low-water springs by a few long pieces of kelp. From it Half Bald Island is shut in by Bald Tusket Island, the latter being 1.7 miles distant. This danger has deep water all around it and shows a rip during the run of the tide.

Clearing marks.—Half Bald Island, seen open to the eastward of Bald Tusket Island, bearing 328°, leads eastward and open westward, bearing 338°, leads westward of Cleopatra Shoal.

Between Cleopatra Shoal and Bald Tusket Island there are two small shoals with 2¼ and 3 fathoms, respectively, both being marked by rips during the strength of the tides; there is a deep channel about 1,400 yards broad between them and Bald Tusket Island, and a similar deep-water passage between them and Cleopatra Shoal.

Peases Island Ledge, about 200 yards in extent, lies near the western end of an extensive shoal spit off Frenchman Point and covers at one-third flood; it is about ¼ mile from the eastern point of Peases Island, with a deep-water channel between.

Clearing marks.—The barn on Ellenwood Island, in range with the northern end of Peases Island, bearing 307°, leads between the ledge and Peases Island, and the southern point of Spectacle Island open of the southern point of Peases Island, bearing 265° 30′, leads to the southward of the ledge.

Peases Island Lights.—A fixed and group flashing white, showing alternately red and white, elevated 56 feet above high water, visible 12 miles, from all points of approach from the southward, and through the Schooner and Ellenwood Passages, is exhibited from a white square lighthouse, 42 feet high, on the southern side of the island.

A fixed red light, 40 feet above high water, is shown from a window of the lighthouse, visible 4 miles, marking the channel between Old Man and Old Woman Rocks.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to passing vessels.

Marks Island Ledge uncovers at low-water springs and lies 300 yards off the western side of Marks Island; it shows a considerable rip during the strength of the tide, which runs over it with great velocity.

Clearing marks.—Allen Island, open northward of Marks Island, leads north of the ledge, and Bald Tusket Island, open southward of Half Bald Island, leads westward of the ledge.

Allen Rock lies 300 yards off the southern end of Allen Island, and shows a whirl in the strength of the tide. The barn on Ellenwood Island, in line with the southwestern end of Allen Island, leads southwestward, and Owls Head, open eastward of Allen Island, leads eastward of the rock.

Schooner Passage Rock, with 1½ fathoms water, lies nearly midway between Owls Head and Turpentine Islands, with a deep-water channel on either side. The eastern end of Murder Island, shut in with Candlebox Island, leads westward of the rock.

A can buoy, painted black and red in horizontal bands, with "Schnr. Rock," in white letters, is moored on the northern side of Schooner Passage Rock.

Owls Head Shoal—Buoy.—Owls Head Shoal extends about 400 yards northward from Owls Head Island.

A black can buoy, with "Owls Head" in white letters, is moored in 6 fathoms off the northern extremity of the shoal.

Bird Rock, at the outer end of a reef extending from the southern end of Owls Head Island, always shows, being about 2 feet above high-water springs, and occupies nearly a mid-channel position between Ellenwood and Owls Head Islands.

Spectacle Ledge, about 400 yards long and very narrow, has about 2 fathoms water on it, and is marked by a large rip during the strength of the tide. From the shoalest spot, the southern end of Spectacle Island bears about 7° ¾ mile and the southern end of Half Bald Island 1.2 miles 72°.

Clearing marks.—The southern end of Peases Island, in range 50° 30′ with the northern end of Half Bald Island, leads south of Spectacle Ledge; and the cliff on southwestern end of Ellenwood Island, bearing 5°, open eastward of Spectacle Island, just clears to the eastward.

Candlebox Island, which is small, lies almost in the center of a circle formed by Murder, Deep Cove, Eagle, Turpentine, and Owls Head islands, being 600 yards northeastward from the northeastern extremity of the last-named island.

Candlebox Island Light, fixed red, elevated 56 feet above high water, visible 8 miles, is exhibited from a white, square, wooden tower, 37 feet in height, with a red lantern, near the center of Candlebox Island.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

Bell buoy.—A bell buoy, painted in black and white vertical stripes, is moored about ¾ mile 297° from Candlebox Island Light, in 8 fathoms of water in the northern entrance to Schooner Passage. Vessels bound to the southward through Schooner Passage, steering a course 123° from the buoy, will pass midway between the shoals off Murder Island and Owls Head.

Murder Island Ledge is on the edge of the shoal extending eastward from Murder Island and about ¾ mile northward of Candlebox Island.

Cow Ledge lies about 1,600 yards northward of Murder Island Ledge, and between them are two shoals with a least depth of 3 fathoms.

A red spar buoy is moored in 5 fathoms on the western side of Cow Ledge, and a similar buoy is moored at the western end of the 3-fathom spot, about 700 yards southward of Cow Ledge.

Tides.—High water, full and change, at Ellenwood anchorage is at 9 h. 54 m.; springs rise 13 feet and neaps 10½ feet.

Tidal currents.—The current turns a little after high and low water, respectively, and runs rapidly through the Tusket Island Passages, the tide rips being numerous and heavy. Its general set is flood to the northwest and ebb southeast, but this is modified by the position and shape of the islands, which form considerable eddies, and by the mainland, in the vicinity of which the current follows its direction. The average velocity is from 2 to 4 knots an hour and round some points its velocity probably exceeds the latter; off the northeastern point of Ellenwood Island the current runs 4 knots and in Schooner Passage 3 knots per hour.

Directions for Schooner Passage.—To run through Schooner Passage from the eastward keep Owls Head open of Allen Island, bearing 323°, which will lead eastward of Old Man and Little Bald Tusket Shoals, and when the barn of Ellenwood Island appears in range with the northeast end of Peases Island alter course immediately to keep these marks in range, in order to pass westward of Peases Island Ledge, which should be rounded close-to on the flood, as it sets strong toward the southern point of Peases Island.

Having passed the Narrows, bring Candlebox Island, which will be recognized by its lighthouse, midway between Allen and Haymaker Islands, and steer for it; this course will lead clear of Haymaker Ledge and Allen Rock, and after passing Allen Island keep to the westward and pass westward of Schooner Passage Rock by bearings of Candlebox Island Lighthouse.

Pass Candlebox Island close-to on its western side, and steer out through the Narrows of the northern entrance, with the southern point of Candlebox Island apparently in range with Turpentine Island, until Owls Head appears in range with the western tangent of Haymaker Island, and with these latter marks in range astern steer out westward of the bell buoy between Murder Island Shoal and the shoal spit extending from the northwest point of Murder Island.

For Ellenwood Passage.—If intending to proceed through Ellenwood Passage, after passing Peases Island Ledge keep the barn on Ellenwood Island just open south of Allen Island, bearing 305° to clear Allen Rock, and after passing it keep in mid-channel between Marks and Allen Islands, altering course to pass between Bird Rock and Ellenwood Island. After passing Bird Rock bring it in range with the eastern point of Marks Island, which will lead through the deep-water channel of the sand narrows, continue on for the bell buoy until Owls Head and the western tangent of Haymaker Island are apparently in range, then steer out with these marks in range astern, as before directed.

Anchorages.—Good anchorage will be found in Schooner Passage, off the northern end of Allen Island, in 5 to 9 fathoms, mud; and there is also good anchorage to be obtained in Ellenwood Passage, off the barn, about 300 yards to the northward of Bird Rock, in about 5 fathoms, gravel and sand. Care should be taken to anchor out of the strength of the tide in Ellenwood Passage, on the following bearings: Bird Rock 111° and the barn on Ellenwood Island 252°.

To approach this anchorge from the southwestward, keep the cliff on the southwestern point of Ellenwood Island open eastward of Spectacle Island, bearing 7° in order to clear Spectacle Ledge (a close mark), taking care not to open out Holmes Island until past Harriet Ledge.

When the southern end of Peases Island is in range with the northern end of Half Bald Tusket Island, steer for the southern end of Marks Island, and passing it on its eastern side, steer through Ellenwood Passage to the anchorage before described.

Off-lying dangers.—Gannet Rock, barely 400 yards long, is a narrow rocky ledge having near its southern end a peak, 50 feet high, resembling a sugar loaf, with a lump on its northern end of almost equal elevation. From the peak Cape Fourchu, East Cape Lighthouse bears about 358° 9.3 miles and Seal Island Lighthouse 158° 15.7 miles; both will be in sight in clear weather.

Two detached rocks lie southward of Gannet Rock at the distance of about 250 yards.

North Rock, of very small extent, shows about half tide, and lies ½ mile 345° from Gannet Rock.

South Rock, also small and showing at half tide, lies 1,400 yards 170° from Gannet Rock.

Southeast Rock, about 1.3 miles 148° from Gannet Rock, is covered by less than 1 fathom water; it shows two distinct breaks in heavy weather, and a considerable rip during the strength of the tide. It is steep-to on its eastern and western sides, and from it Cape Fourchu, East Cape Lighthouse appears just in range with the eastern tangent of Green Island.

Gannet South Shoal lies 4.3 miles 165° from Gannet Rock, the least water found upon it being 4 fathoms; it shows a tide rip, and breaks in a very heavy sea. From it the outer high lump of Cape Fourchu is just open of the eastern tangent of Green Island.

Gannet Southwest Shoal lies 3 miles 190° from Gannet Rock, and has a depth of 3 fathoms on its northern and southern extremities; it extends 700 yards north and south, shows a tide rip, and breaks in heavy weather. Green Island, open westward of Gannet Rock, leads over the shoal.

Gannet Dry Ledge, about ¼ mile long, uncovers at 2 hours ebb, and generally breaks; it lies 1.7 miles 215° from Gannet Rock Peak. Although there is a sufficient depth of water between the ledge and Gannet Rock, vessels as a rule should pass outside.

A bell buoy, painted red, with "Gannet Ledge" in white letters, is moored in about 16 fathoms, 1 mile 269° from the middle of Gannet Dry Ledge.

Jacko Ridge consists of 2 rocky patches about 1.3 miles in extent in a north and south direction, with a depth of 4½ fathoms over the northern patch and 5 fathoms on the southern. It is the most off-lying of the series of detached rocky irregularities, already described, extending from Chebogue Point, from which it is 12 miles 185°. This ledge should be avoided in heavy weather, as it breaks. In moderate weather it shows a long tide ripple.

Green Island, about 700 yards long and 50 feet high, is distant 2.8 miles 201° from Chebogue Point. The southern point of this island should be given a berth of at least ½ mile, as detached rocks and a ledge, upon which the depth is 3½ fathoms, extend in that direction from it. The other shores are steep-to.

Caution.—The foregoing shoals and ledges being very uneven it is highly probable that when examined the least water might not have been discovered. Vessels are therefore recommended to avoid their positions.

Reef Island Ledge, off the entrance of Chebogue River, uncovers at a quarter ebb and is shoal all round for a considerable extent. Between it and Reef Island there is no safe channel, while to the southward shoal water extends to the distance of 1 mile. From the center of the ledge Chebogue Points bears 311°, and the southern end of Reef Island 92° ½ mile.

Reef Shoal, about ¼ mile long, has 2 fathoms on its shoalest part, situated 2 miles 50° from the northern point of Green Island; although there is deep water on either side, the shoal, which causes a tide rip, had better be passed on its western side.

Clearing mark.—Cape Fourchu East Cape Lighthouse, 339°, open to the westward of western tangent of Chebogue Point, clears this shoal close-to on its western side, and also leads through the inner channel.

Chebogue Point Shoal is extensive, covered with 2¼ fathoms water, about ½ mile off the pitch of Chebogue Point, with a depth of 3½ to 5 fathoms in the channel between.

Chebogue Ledge, about 700 yards in extent, has only 2 feet water on its shoalest part, from which Chebogue Point bears 35° 1 mile. It is very dangerous, shows a tide rip, and breaks with an ordinary swell at low water. There is a good broad channel between this danger and Green Island, 1.5 miles to the southward.

Foul ground, about ½ mile long, with but 1½ fathoms water, lies with the southern end of Reef Island in range with Chebogue Point, bearing 117°, the latter point being distant 1.5 miles. Between the shoal and the shore, in the vicinity of Chebogue Point, the distance is about 1,400 yards, with a deep-water channel ¼ mile wide between the 5-fathom curve.

Bell buoy.—A red bell buoy, with "Yarmouth F'w'y" in white letters, is moored in 10 fathoms, about 1.5 miles westward of Foul Ground, and in the fairway of the southern approach to Yarmouth Sound; from it Roaring Bull bears 50° 1.5 miles, and Cape Fourchu East Cape Lighthouse 16°.

Roaring Bull, a small rock about 1 mile from the shore, uncovers about ½ fathom at low-water springs, and is in the direct line between Green Island and Cape Fourchu East Cape Lighthouse. It lies about ½ mile northward of a shoal on Foul Ground, and from it Chebogue Point bears 128° 1.8 miles. The rock shows a tide rip and breaks with an ordinary swell.

A red conical buoy is moored about 200 yards 276° from the rock.

Chebogue River.—The approaches to Chebogue River are studded with dangers, for which, especially in hazy weather, no good clearing marks can be given.

The bar extends across its entrance, having in one part less than 2 fathoms water.

A red wooden spar buoy is moored at the western end of the Middle Ground, northwestward of Fox Island, Chebogue Harbor.

Anchorage.—There is, however, a safe anchorage inside the entrance of the river, and in cases of necessity it may be used by vessels of moderate draft.

Good anchorage in smooth water, though in a limited space, may be obtained in a depth of 2½ fathoms about 250 yards within the northern point of Fox Island, care being taken to keep Gannet Rock in sight in the middle of the entrance, in order to avoid the mud bank on the western shore, and two small mud banks in the middle of the channel at its bend.

Tides.—High water, full and change, in Chebogue River is at 10h. 4m.; springs rise 15 feet and neaps 11¾ feet.

Water.—Good water can be obtained.

Directions.—A vessel approaching from the southwest and being in the vicinity of Green Island should steer a course to pass westward of Reef Shoal, and when the western end of Perry Island appears in range with the sandy spit opposite Fox Island, bearing 13°, steer for it on that bearing over the bar and pass about midway between Fox Island and the spit.

If from the westward, bring the end of Earthy Cliff to the northward of Garden Head, just open southward of Chebogue Point, bearing 61°. These marks will lead in sufficient water northward of Chebogue Ledge and Shoal. When the northern end of Reef Island bears 97° steer for it until the western end of Perry Island appears in range with the spit already alluded to, when proceed as before directed.

Yarmouth Sound is available as an anchorage with all winds except those between south and west, when it is dangerous, especially if they are strong. The sound is a good summer anchorage for vessels of 15 feet draft, but is not safe in October, as southwesterly gales come on suddenly and send in a heavy sea.

The best anchorage is in about 20 feet, sandy bottom, with the lighthouse bearing about 269° ¼ mile. The shore inside the lighthouse should not be approached within 200 yards, as several detached rocks lie off it.

Buoys.—A cylindrical buoy, painted black and white in vertical stripes, marked "Y'm'th S. W. F'y" in white, surmounted by a whistle and lantern, from which an occulting white light, eclipsed at short intervals, is exhibited, is moored in 34 fathoms in the fairway to Yarmouth Harbor, 10 miles 223° from Cape Fourchu Lighthouse.

A red cylindrical buoy, marked "Y'm'th N. W. F'y" in white, surmounted by a pyramidal frame supporting a whistle and lantern, from which an occulting red light, eclipsed at short intervals, is exhibited, is moored in 22 fathoms, 5 miles 285° from Cape Fourchu Lighthouse.

A red bell buoy, marked "Yarmouth F'w'y" in white, is moored in 10 fathoms in the fairway of the southern approach to Yarmouth Sound and 2.5 miles 271° from Chebogue Point, about 1.5 miles to the westward of the Foul Ground.

A black bell buoy, marked "Cat Rock" in white, is moored in 9 fathoms, 800 yards south-southwestward from Cat Rock, the extremity of the shoal ground extending southward from East Cape.

Cape Fourchu appears to embrace the two points East and West Capes, with Outer False Bay between them.

Cape Fourchu East Cape Light, flashing white, elevated 121 feet above high water, visible 17 miles, is exhibited from an octagonal building, 64 feet in height, painted with red and white vertical stripes, surmounted by a cylindrical lantern, situated at about ¼ mile to the northward of East Cape, on the western side of the entrance of Yarmouth Sound.

Fog signal.—A steam fog whistle is sounded on the western side of the lighthouse.

Hen and Chickens consist of a cluster of rocks, which begin to uncover about two-thirds ebb, extending about 400 yards from the shore, on the eastern side of the sound opposite the lighthouse on East Cape.

Clearing mark.—A good mark for clearing them on their western side is the Independent Church Spire at Yarmouth in range 21° with the middle of Low Beach at the head of the sound.

Buoy.—A red cylindrical buoy surmounted by a frame supporting a bell and lantern, from which an occulting red light is exhibited, is moored on the western side of the shoal.

A black can buoy is moored, in 2½ fathoms, eastward from the ledge off Johns Cove.

Rocks.—The principal danger, outside the light at the extremity of Bunker Island Ledge, is a rock, with 1 foot water, lying 350 yards northeastward from Ships Stern, while the most important danger inside is Sollows Rock, in the middle of the channel, which uncovers nearly ¾ fathom at low water, 400 yards northward of the light.

A can buoy, painted red and black in horizontal bands, is moored to mark the middle ground, a 3-fathom spot 800 yards southward of Bunker Island Lighthouse, northeastward of Johns Cove.

Shoal.—A shoal with a depth of 14½ feet lies eastward of Johns Cove.

A black wooden spar buoy is moored at the eastern edge of the shoal.

Lifeboat.—A lifeboat is stationed in Bakers Cove, just within the Hen and Chickens Shoal, at the southeastern side of Yarmouth Sound.

Yarmouth Harbor.—There is no anchorage in the harbor off the town, but there are a number of wharves on its eastern side, with depths of 19 feet alongside, most of them being connected with the railroad. The harbor is open all the year round.

Bunker Island Lights.—A fixed red light elevated 31 feet above high water, visible about 10 miles, is exhibited from a white square wooden structure, built on a circular steel and brown concrete base, erected on the end of the reef, extending from the southwest point of Bunker Island. The light is visible over Stanwood Beach when bearing from 111° to 156°.

Vessels outside the harbor must not steer for the light between the last two bearings, as there is no entrance to the harbor from the northward, entrance to the harbor being through Yarmouth Sound and around East Cape.

A fixed red light, elevated 38 feet above high water, and visible 6 miles, is exhibited from a white square wooden structure 22 feet in height, and with sloping sides, situated near the north point of Bunker Island.

A fixed red light, elevated 20 feet above high water, is exhibited from a mast surmounting a dolphin, situated on the eastern side of the channel, 400 yards southwestward of the head of Long Wharf.

Fog signal.—A fog bell is struck by machinery on the western side of the Bunker Island Lighthouse.

Dredged channel.—A channel 333 feet wide has been dredged, extending 1,800 feet inside Bunker Island Southwest Light, locally known as The Bug Light. The axis of this dredged channel is 416 feet westward of the light and extends in a 222° direction.

Buoys and beacons.—The channel leading to the town is marked by buoys according to the uniform system, and with 42 pile dolphins driven into the flats.

About half way to the town the channel turns and at this turn is a light on one of the dolphins.

Tides.—High water interval at Yarmouth Harbor is 10h. 01m.; mean range 14 feet, spring range 16 feet.

Tidal currents.—The tidal current changes its directions a little after high and low water by the shore, respectively.

From Ellenwood Island to Yarmouth, the flood current runs between the ledges inside Green Island at a velocity of about 3 knots an hour during its strength, with a short interval of slack water. The flood sets strong round Cape Fourchu to the northward, so that a vessel, making for Yarmouth Sound, should haul up immediately after clearing Roaring Bull Rock.

Anchorages.—The best anchorage is in a depth of about 3¼ fathoms, over sandy bottom, about ½ mile east-southeastward of East Cape Lighthouse. The shore inside the lighthouse should not be approached within 200 yards, as several detached rocks lie off it.

The anchorage within Bunker Island is safe from all winds, but the channel leading to it is narrow, circuitous, and being studded with dangers should not be attempted without a pilot, whose services can be procured by making the usual signal when off the East Cape Lighthouse. In the event of a vessel being caught in the sound during a southwest gale, and compelled to run for the inner anchorage, the following directions may prove serviceable.

Directions.—If from the Sound anchorage, steer to the northeast, passing westward of the light and bell buoy marking the Hen and Chickens, until the northern end of Ships Stern bears 342°, when it should be steered for keeping about 200 yards from its eastern side, and passing on the western side of Bunker Island Lighthouse about the same distance.

After passing the lighthouse steer to pass about 400 yards from Bunker Island shore through the buoyed channel; and about 250 yards to the northward of Battery Point, good anchorage will be found in 5½ fathoms.

Wharves.—There are 20 wharves in the harbor of Yarmouth. Nineteen are on the eastern side and one on the western. There is a dredged channel with a least depth of 4 feet at low water leading up to the one on the western side, marked by four pile dolphins. The depth of water alongside the wharves on the eastern side is 19 feet at low water. Most of these have sheds for receiving freight and at three of them, where lumber is loaded, cars run to the vessel's side. At Bakers Wharf passenger steamers from Boston land passengers from the vessel directly into cars. On the southern side of Bakers Wharf a berth has been made for unloading coal, 250 feet long, 90 feet wide with 20 feet of water at low tide.

Vessels load and unload by manual labor, in which hand trucks and gangways are used by steamers, but in the case of lumber when loaded in steamers, it is hoisted and lowered by the vessel's winch.

Patent slip—Repairs.—There is a marine slip for hauling vessels out, up to 1,200 tons register, for repairs, and a shipyard belonging to the Burrill-Johnson Iron Co., where steel vessels are built or repaired. The yard is covered from the weather and work can be carried on night and day.

Supplies.—All kinds of ship's stores can be easily procured.

Communication.—Yarmouth has lines of steamers in summer run from Boston and Bay of Fundy ports and these lines also connect in winter, but not so frequently, as the traffic is not so great during winter. Also has railroad communication east by the Dominion Atlantic Railway running to Halifax and with St. John by rail and ferry steamer from Digby. It has telegraphic communication with all parts of the Province of Nova Scotia and other parts of Canada.

Coal.—A considerable supply of coal is kept at Yarmouth.

Water.—There are waterworks for the town.

Industries.—The chief industries are shipbuilding, cotton mills, iron foundries, machine shops. The chief shipments are fish, lumber, and cotton.

Storm signals.—Storm signals are hoisted at Yarmouth.

The town has a population of about 8,000.

Hospital.—There is a hospital for seamen situated on Bunker Island.

The United States is represented by a consul, vice and deputy consul.

Lurcher Shoal consists of two shoal patches, Northeast and Southwest Lurcher, 2¼ miles apart, having between them a channel in which the depth is 7 to 17 fathoms.

Southwest Lurcher Shoal, which is the larger and shoaler, has 1½ fathoms least water on it, shows a considerable rip during the strength of the tidal current, and breaks in heavy weather; it is situated 14.7 miles 280° from Cape Fourchu East Cape Lighthouse.

Northeast Lurcher Shoal has 5 fathoms least depth on it, and shows a good tide rip.

Lurcher Shoal Light Vessel, exhibiting two occulting white electric lights, one at each masthead, both elevated 60 feet above the sea, visible 13 miles, is moored in 52 fathoms of water 2½ miles 224° from the 1½-fathom spot on Lurcher Shoal, with Cape Fourchu East Cape Lighthouse bearing 92° 30′.

The light vessel is painted red, marked "Lurcher" in white on each side and "No. 14" on each bow, and has two masts with a funnel between them, but no bowsprit. Should the electricity fail, oil lights of a similar character but of less power will be exhibited.

Fog signals.—A diaphone horn, worked by compressed air, is sounded. If the diaphone is out of repair, a whistle will be sounded.

Submarine bell.—The light vessel is also fitted with a submarine bell, which will, during thick or foggy weather, give strokes indicating the light vessel's number (14) every 23 seconds, thus: One stroke followed by an interval of 5 seconds, then 4 strokes at intervals of 2 seconds, followed by an interval of 10 seconds. There may be slight variation in these intervals.

Radio.—Lurcher Shoal Light Vessel is equipped with a radiotelegraph apparatus.

Vessels desiring to report to St. John or Halifax may communicate with the light vessel by radio or by showing their distinguishing numbers.

The radio operator on Lurcher Shoal Light Vessel will be on watch during the first 15 minutes of each hour from 7 a. m. to 10.15 p. m., 60th meridian time.

Whistle buoy.—A whistle buoy, painted in red and black horizontal bands, marked "Lurcher Shoal" in white, is moored in 13 fathoms 800 yards westward of Southwest Lurcher Shoal.

Tidal currents.—At Northeast Lurcher Shoal the ebb current commences at 1h. 30m. after the time of high water at Yarmouth; at neap tides it attains a velocity of 2.5 knots an hour, the average set, in a tide, being about 9.3 in a southerly direction. The flood runs in an opposite direction, its greatest velocity at neaps being about 2¼ miles an hour, and its average set, in a whole tide, 8 miles. The slack is fully one hour in duration.

Coast.—From Cape Fourchu, in the immediate vicinity of Yarmouth, the coast takes a northerly trend as far as Cape St. Mary, a distance of 17.5 miles. This extent of coast is of an undulating character, varying in elevation from 20 to 100 feet, and with the exception of one off-lying danger, viz, Trinity Ledge, though the bottom is uneven and as a rule hard, the coast appears to be free from danger, and may be considered safe to approach to the distance of ¾ mile. There is, however, a 4½-fathom patch 1.4 miles offshore, 2 miles 321° from Port Maitland Light, and a tongue with a similar depth on it extending 1,400 yards from the head on the northern side of the entrance to Salmon River.

Sandford Harbor Light, fixed white, visible 6 miles, is exhibited from a wooden pole, with a white shed at the base, 25 feet above the water, on the outer end of the public wharf at Sandford.

Port Maitland Light, fixed red, elevated 26 feet above high water, visible 6 miles, is exhibited annually from March 15 to December 31 from a white square wooden tower, 27 feet high, on the extremity of the western breakwater at Port Maitland. This light indicates the entrance to the cove between the two breakwaters.

Fog signal.—A bell is struck by machinery.

The village has a population of about 600, engaged in fishing and farming.

Trinity Ledge consists of three small heads close together, all of which uncover at low-water spring tides, the highest being then 3½ feet above the water, situated 6.8 miles 217° from Cape St. Mary Lighthouse and 13.5 miles 330° from Cape Fourchu; the others are just awash. The ledge and the comparatively shoal ground in its vicinity cause a great rip during the strength of the tide; the rock breaks heavily in bad weather, and should not be approached nearer than ½ mile. Between it and Black Point, on the mainland, a distance of 6 miles, the bottom is broken and irregular, with depths of from 6 to 11 fathoms.

Light and whistle buoy.—A combined light and whistle buoy showing an occulting white light is moored 1 mile 180° from Trinity Ledge.

The buoy is cylindrical, surmounted by a pyramidal steel frame supporting the whistle and lantern, painted red and black in horizontal bands, with "Trinity Ledge" in white letters on the deck.

The buoy may be treated as a middle ground buoy, but the ledge should not be approached nearer than ½ mile.

Tidal currents.—The tidal currents run with great strength at Trinity Ledge, attaining a velocity of 2.6 knots an hour; the ebb sets about southerly and the flood northerly.

Cape St. Mary Light, alternating red and white, elevated 103 feet above high water, and visible 16 miles, is exhibited from a white octagonal lighthouse, 43 feet in height, on Cape St. Mary.

A light, visible 5 miles, 12 feet above high water, is exhibited from a wooden post 6 feet high near outer end of breakwater at Cape St. Mary.

Fog signal.—A diaphone fog signal is sounded from a square white wooden building with a gable roof, 70 feet southwestward of the lighthouse.

St. Mary Bay is an arm of the sea running in from between the entrance points in a northeastward direction. The entrance, which lies between Cape St. Mary and Brier Island, is about 10½ miles across, and from thence the bay gradually decreases to about 3 miles in breadth.

The bay is of peculiar formation, its western shore consisting of a mere strip of land, upward of 1 mile in length, and forming a natural breakwater for a distance of 30 miles, with a varying elevation between 430 feet at its neck and 100 feet on Brier Island. Through this natural barrier are two narrow navigable channels, known as Grand and Petit Passages, through which the tide rushes with great velocity; the latter is the shortest route between St. John and Cape Fourchu, and being entirely free from danger is available for steamers or sailing vessels with favorable wind and tide.

The St. Mary Shore of Long Island is bold-to, and a vessel can pass fairly close along it, except in rounding Dartmouth Point, off which some ragged rocks, marked by a buoy, lie nearly 300 yards distant.

After passing Petit Passage the western coast of St. Mary Bay, or the Digby Neck Shore, trends about northeastward, and is generally bold and straight; it may safely be approached to 200 yards as far as 4 miles beyond East Sandy Cove, after which the water gradually shoals to the head of the bay.

The principal trade at St. Mary Bay is in cordwood; shipbuilding is also carried on.

St. Mary Shoal.—To the eastward of East Sandy Cove, on a broad tongue of shoal water extending from the head of the bay, lies St. Mary Shoal 2¼ miles in length, in a northeast and southwest direction, and ¾ mile in breadth within the 3-fathom curve. A rock covered with about 1¼ fathoms water lies upon the shoal near its southeastern extremity, about a third of the distance across the bay from the western shore; from this rock the eastern point of East Sandy Cove bears 245° 3 miles and the northwest point of Gilbert Cove 105° 2½ miles.

About ¾ mile, in a southeasterly direction from the rock already mentioned, there is a shoal patch nearly ½ mile in length with a least depth of 2½ fathoms, and from this position patches of 3 fathoms lie in a northerly and westerly direction.

Channels.—There is a narrow vein of deep water close to the Digby Neck Shore which extends as far as the northern extremity of St. Mary Shoal, also another deep vein on the main shore which extends about 1 mile above Gilbert Point, but the southern extremity of the tongue of shoal water, on which St. Mary Shoal stands, has depths of 3½ fathoms lying very close to the 5-fathom curve.

Meteghan River Light, fixed green, elevated 23 feet above high water, visible 6 miles, is exhibited from a lighthouse, 21 feet in height, painted with vertical red stripes on the seaward side, and having a black lantern, situated on the end of the breakwater at Meteghan River, at about 8 miles northeastward of Cape St. Mary.

Bell buoy.—A bell buoy, painted red, and marked "Meteghan," is moored in a depth of 6 fathoms about 2 miles 226° from the above light.

Church Point Light, occulting white, elevated 36 feet above high water, visible 10 miles, is exhibited from a white square wooden building, 20 feet in height, on Church Point, eastern side of St. Mary Bay.

Belliveau Cove Light, fixed green, elevated 24 feet above high water, visible 4 miles, is exhibited from a white square wooden lighthouse, 22 feet in height, on the eastern pierhead, Belliveau Cove.

Sissiboo River—Anchorage.—Off Sissiboo River good anchorage may be obtained in about 5½ fathoms, mud, about ½ mile from the shore, but the river can only be entered by boats at low water, when only small vessels can lie afloat in it.

Sissiboo Light, fixed white, elevated 36 feet above high water, visible 8 miles, is exhibited from a white square tower, 33 feet in height, on the southern side of the entrance of Sissiboo River.

A channel 8 feet deep at low water, ordinary spring tides, and 100 feet wide, has been dredged through the bar at the mouth of Sissiboo River.

The channel extends in a 125° direction from the 8-foot curve in St. Mary Bay through the shoal across the river channel to the northeastern point of the shoal extending northward from the lighthouse, and thence in a 134° direction to the point where the natural channel of the river exceeds the dredged depth.

The 8-foot depth is not available much beyond the Campbell Lumber Co.'s wharf at North Weymouth, but it is proposed eventually to deepen and straighten the channel up to Weymouth Bridge.

The edges of the dredged channel are marked by three black and three red wooden spar buoys.

Weymouth Harbor is on the Sissiboo River, which empties into St. Mary Bay on the eastern side. Weymouth Harbor being a bar harbor, vessels enter a short time before high water. The depth of water in the river varies considerably and is very shoal at low tide. Tugs are available to tow vessels into the wharves and services of pilots can be obtained. Deep draft vessels load from lighters in the bay. The river is buoyed. The tides in the vicinity of Weymouth in the bay rise 24 feet springs and 20 feet neaps. There is a ballast ground in the bay where ballast is unloaded.

Wharves.—There are six wharves in the harbor owned by private individuals, and one wharf at lower Weymouth. The depth of water at the wharves ranges from 10 to 14 feet at low water.

Communication.—Weymouth is connected by telegraph and rail with the Canadian systems.

Gilbert Cove affords the best anchorage in the bay, in about 4 fathoms, over a mud bottom.

Gilbert Point Light, fixed red, elevated 40 feet above high water, visible 7 miles, is exhibited from a lantern surmounting a white square wooden house, with a red roof, the whole 36 feet in height, on Gilbert Point, about 4 miles northeastward of Sissiboo River.

Water.—Fresh water can be obtained at Gilbert Cove from a stream running over the rocks near an old mill.

Tides.—It is high water, full and change, at East Sandy Cove at 10h. 33m.; springs rise above 21½ feet, neaps 17¾ feet.

At the head of the bay the height of the tide is affected by the winds, those from the southwest keeping the water above and those from the northeast keeping the level below its mean height. The currents on the eastern side of St. Mary Bay set parallel to the coast at a velocity of about 1 knot an hour, but near the passages they set to and from them at from 2 to 2.5 knots an hour.

Anchorages.—Large vessels may anchor in any part of St. Mary Bay between East Sandy Cove and Sissiboo River in from 10 to 12 fathoms, and with good ground tackle may ride out any gale, as the sea at this anchorage, even with southwesterly winds, to which it is exposed, becomes exhausted.

There are three anchorages for small vessels on the western shore of the bay, viz, Little River, Mink Cove, and East Sandy Cove; the last named, being the largest as also the best sheltered, is most frequented. In it vessels of 12 feet draft can find good shelter from all winds between south-southwest through west to northeast, and if distressed by a southeasterly wind they can find security by running on the mud.

Water.—Fresh water can be obtained at the head of East Sandy Cove when the tide is up, except during dry seasons.

Directions.—When off Cape St. Mary and bound up the bay, the coast may be approached within ½ mile until 2 miles from the Meteghan River, where it becomes low; beyond this, rocky ridges extend off the coast as far as Como Wharf, and the shore should be given a berth of at least 1 mile. Beyond Como Wharf the shore may be approached to within a distance of about ¾ mile, and when the remarkable notch in East Sandy Cove on the Digby Neck side shows open steer toward the entrance of the Sissiboo River.

About 4 miles northeastward of the river is Gilbert Cove; the coast between, off which a shoal extends nearly ½ mile, can be approached to about ¾ mile; roads from the interior indicate the position of the shoal. After passing this shoal a vessel may steer toward Gilbert Point, beyond which good anchorage will be found. Beyond Gilbert Cove the water shoals to the head of the bay.

Brier Island Light, group flashing white, elevated 92 feet above high water, visible 15 miles, is exhibited from an octagonal lighthouse, 55 feet in height and painted white, with three red horizontal bands, on the northwestern point of Brier Island.

Fog signal.—A diaphone horn is sounded from a building south of the lighthouse.

Signal station.—Any vessel showing her official number to Brier Island signal station is reported immediately and posted in St. John.

Brier Island Southwest Ledge has 2 fathoms water on its shoalest part, which lies 1.9 miles 227° from Gull Rock. Between this ledge and Gull Rock there is a channel 1½ miles wide, and the rock can be approached to ¼ mile on its western side.

Light and whistle buoy.—A red cylindrical buoy, marked "S. W. Ledge" in white, surmounted by a pyramidal frame, supporting a whistle and lantern, from which an occulting red light is exhibited, is moored 1.9 miles 226° from Brier Island Southwest Ledge.

Brier Island Northwest Ledge is of large extent and lies to the northwestward of the northern point of Brier Island, with deep water close to its northwest side.

There are several shoals on this ledge, the principal of which are Northwest Rock, Beatson Rocks, and Frenchman Elbow.

The Northwest Ledge extends 1.3 miles east-northeastward of Beatson Rocks; during the strength of the tide it shows a heavy tide rip along its whole length and breaks heavily on its shoal parts when there is much sea.

Northwest Rock is small, with 1 fathom water, situated 4.2 miles 354° from Brier Island Lighthouse.

Clearing mark.—Mourilyans Mark (a large granite bowlder), on a hill on Long Island, in range 133° with North Point, Brier Island, leads northward and eastward of this rock and of the whole ledge.

Beatson Rocks consist of two small rocks, 200 yards apart, covered with 2 fathoms of water. The northeastern, with 2 fathoms, lies 1 mile 235° from Northwest Rock, the passage between having a depth of not less than 6 fathoms.

Clearing marks.—Gull Rocks, bearing 160°, seen well open of Whipple Point, leads to the westward of the light and whistle buoy marking Beatson Rocks; Gull Rock, in range 169° with Whipple Point, leads between Beatson and Northwest Rocks.

Light and whistle buoy.—A red cylindrical buoy, marked "N. W. Ledge" in white, surmounted by a pyramidal frame supporting a whistle and lantern, from which a fixed red light is exhibited, is moored westward of Beatson Rocks.

NOTE.—The color of the light is in contravention of the rule that light buoys on the starboard side in going against the ebb tide will exhibit occulting red lights; the change in this instance is made on account of the desirability of picking up the light at the greatest possible distance. (See Light List.)

Frenchman Elbow, a long rocky strip having a depth of 5½ fathoms on its shoalest part, lies between Northwest Rock and the northern point of Brier Island, being about 1 mile from the former.

Channel.—There is a good passage between Frenchman Elbow and Brier Island, the northwestern coast of which may be approached to ¼ mile.

Tidal currents.—The tidal currents run very strong over the Northwest Ledge, the ebb taking a southerly and the flood a northerly direction, with a velocity of about 4 knots an hour at half tide. The current changes about ¾ of an hour after that in Grand Passage, or nearly about the time of high and low water there.

Grand Passage.—Grand Passage, between Brier and Long Islands, is narrow and contains several dangers, but the principal difficulty connected with its navigation is the great velocity of the tidal currents through the channel.

Channels.—At the southern end of Grand Passage there is a channel on each side of Peter Island, that on its western side being the shoaler and narrower of the two, with a depth of 2¼ to 3¼ fathoms and clear of danger. The eastern channel has a depth of 6 fathoms.

North Point Light, fixed red, elevated 62 feet above high water, visible 8 miles, is exhibited from a white square wooden tower, 34 feet high, and surmounted by an octagonal lantern painted red, on North Point, the northeastern point of Brier Island, at the northern entrance of Grand Passage.

Fog signal.—A fog bell at the lighthouse on North Point of Brier Island is struck by machinery.

Peter Island Light, fixed white, elevated 62 feet above high water and visible 13 miles, is exhibited from a white octagonal tower, 44 feet high, surmounted by a red lantern, erected on Peter Island.

Beacons.—A reef extends north-northeastward from Peter Island to a distance of about 200 yards; the end of the reef is marked by a black iron spindle, surmounted by a spherical cage, 33 feet in height, which should be given a berth of not less than 50 yards when passing between it and Passage Shoal.

An iron spindle surmounted by a slatwork drum, 10 feet above the water, the whole painted red, is erected on Bald Rock.

Whistle buoy.—A conical whistle buoy, painted in black and white vertical stripes, marked "Grand Passage," is moored in 22 fathoms, 1 mile 180° from Peter Island Lighthouse.

A red conical buoy marks the extremity of the shoal water off Dartmouth Point.

Passage Shoal, with about 1¼ fathoms, shows a tide rip; it lies in the middle of the passage, 346° 800 yards from the lighthouse on Peter Island and 700 yards from its nearest shore.

A can buoy, painted red and black with horizontal bands, is moored immediately northward of the shoalest rock of Passage Shoal.

Cow Ledge extends nearly ¼ mile off the Long Island shore of the northern entrance of Grand Passage; its highest part uncovers soon after high water.

A black can buoy is moored 100 yards northwestward of Cow Ledge Shoal.

Cow Ledge Shoal, with about 2½ fathoms water, lies ¼ mile northward of the highest part of Cow Ledge, and 600 yards 114° from the northern point of Brier Island.

Clearing mark.—Peter Island Lighthouse bearing 179°, or the island open its own breadth westward of Sand Point, clears Cow Ledge and leads through the deep-water channel westward of Cow Ledge Shoal.

Freeport is on the eastern side of the passage and is entered by a narrow channel when the tide is rising.

Passenger steamers call at Freeport from St. John and Yarmouth.

Westport Harbor, Brier Island, is entered from Grand Passage. The harbor is open the year round.

Anchorage.—Close in on Brier Island there is good anchorage off the town of Westport in 5 to 7 fathoms mud, with the Episcopal Church bearing 214° and the Baptist Church bearing 256°; only exposed to winds from the northeastward, and even then the water is always smooth at the anchorage recommended.

Wharves.—There are several wharves in the harbor, but none of them extend below low-water mark. The Government Pier affords good landing, with 15 feet at low water.

Westport carries on a considerable trade in fish, and from it limited supplies may be obtained.

Water.—A small supply of fresh water may be procured from wells.

Storm signals are shown at Westport.

Pilots.—Pilots for St. John, New Brunswick, can be obtained at Westport.

Tides.—It is high water, full and change, at Westport at 10h. 43m.; springs rise 21 feet, neaps 17 feet.

The current commences running to the southward fully half an hour before high water by the shore and runs with great velocity through Grand Passage, especially through the two channels at its southern entrance, where it attains a velocity of from 5 to 6 knots per hour.

Directions—West of Peter Island.—In making the southern entrance of Grand Passage steer for the whistle buoy in the approach and pass on either side of it.

To pass westward of Peter Island keep in mid-channel, bearing in mind that the flood current sets with great strength directly on the southern point of Peter Island. When through the channel, if calling at Westport, steer to the northwestward for the anchorage described above.

Caution, however, is necessary in attempting the anchorage off Westport without the assistance of local knowledge, as the tides in the entrance, with a velocity of 5 or 6 knots an hour, form eddies and whirlpools likely to bring a vessel round against her helm and cause her to be stranded.

The holding ground off Westport is good, but the usual anchorage is too close in-shore for large vessels; if farther out vessels should moor, as the eddies would cause a single anchor to foul.

If bound through Grand Passage, having passed westward of Peter Island, steer to the northward, and avoid Passage Shoals by bearings of South Point astern, until the Episcopal Church bears 211°, when alter course for the northern entrance; Peter Island Lighthouse, bearing 179°, or the island open its own breadth westward of Sand Point, leads through in the deep-water channel westward of Cow Ledge and Cow Ledge Shoal.

When North Point, Brier Island, bears 285° the vessel will be clear of Cow Ledge Shoal, and by keeping Peter Island Lighthouse in sight, will pass a long way to the eastward of Northwest Ledge. After passing Cow Ledge Shoal, Long Island may be approached to the distance of 200 yards, but the northern point of Brier Island should not be rounded within 600 yards.

East of Peter Island.—On nearing the passage steer to pass between the whistle buoy and the buoy off Dartmouth Point, and pass mid-channel eastward of Peter Island, and keep mid-channel to the northward until Peter Island Lighthouse bears 179°, then proceed through the northern entrance with the marks already given.

If intending to anchor at Westport, after passing Peter Island, round the beacon on the shoal spit off the northern end of the island, with the Episcopal Church bearing 246°, and passing between the beacon and Passage Shoal, on which the flood sets with great strength.

The foregoing directions for entering Grand Passage from the southward are adapted for flood tide and a leading wind, and any departure therefrom must be contingent on the state of the tide and direction of wind.

Petit Passage, between Long Island and Digby Neck, although narrow, is available for steamers, and for sailing vessels also if the latter have a favorable wind and tide.

Bell buoy.—A bell buoy, painted red, with "Petit Passage" in white letters on the deck, is moored in 10 fathoms at the southern entrance to Petit Passage, 200 yards 173° from the ledge off the south point of Digby Neck.

Shoals.—This passage forms the shortest route between St. John Harbor and Cape Fourchu, and is almost entirely free from dangers, the exception being a small rock, covered with 1¼ fathoms water, lying 12° from the lighthouse and nearly 400 yards from the nearest part of Boars Head. There is a channel with a depth of 4 fathoms between the shore and this rock. The rock shows a tide rip during the strength of the tide and breaks in heavy weather.

Off the southern point of Digby Neck are some rocks which cover at half flood and extend about 200 yards from the shore in a southerly direction.

On the western shore of the Petit Passage an eddy is formed to the northward of Eddy Point, half way through on the western shore of the passage, where small vessels may anchor close in-shore, but they require to be moored head and stern.

Boars Head is the northern extremity of Long Island, forming the western part of the northern entrance of Petit Passage.

Boars Head Light, flashing white, elevated 70 feet above high water, visible 14 miles, is exhibited from a white square wooden building, 33 feet in height, with red octagonal iron lantern, erected 17 yards from the edge of the cliff on Boars Head.

Fog signal.—A foghorn, worked by compressed air, is sounded from a square white building with gable roof, situated close to Boars Head Lighthouse.

Tides.—High water interval at Petit Passage is 10h. 34m.; mean range, 19.3 feet; spring range, 22 feet. The current runs through the passage at a velocity of 6 or 7 miles an hour, the flood to the northward and the ebb to the southward.

Directions.—When entering Petit Passage from the northward, the 1¼-fathom detached rock off Boars Head, already referred to, must be avoided; only small vessels or steamers with local knowledge should attempt to pass inside it; keep in mid-channel until approaching Eddy Point, which projects into the passage; then close the western shore, which is steeper-to than the eastern side in the vicinity of Sandy Point. Off the southern point of Digby Neck are some rocks which cover at half flood and extend about 200 yards from the shore in a southerly direction.

When in the Bay of Funday and wishing to enter Petit Passage on the ebb, make the Digby Neck shore to the eastward of the passage and skirt it along until in the passage, in order to avoid being swept past the entrance. The Digby Neck shore is steep-to and may be approached in safety to within a distance of 300 to 400 yards.

When off Cape St. Mary and running for Petit Passage on the ebb steer for the middle of Long Island until the strip of tide running from the passage toward the cape is past; and when within it a feeble eddy will be found on the Long Island shore setting toward the passage, increasing in strength and decreasing in breadth as it nears the passage, where it extends as far as Eddy Point.

Coast.—The Bay of Fundy shore of Long Island is steep-to within a distance of 200 yards, until approaching Boars Head, when the 1¼-fathom detached rock, already referred to, must be avoided.

From Petit Passage the shore of Digby Neck, on the Bay of Fundy side, is straight and steep-to as far as Sandy Cove, and may be passed at a distance of 400 yards.

Between Sandy Cove and Gulliver Hole the coast trends about northeastward for 10.5 miles, and from the western point of Gulliver Hole to Digby Gut the distance is about 8 miles northeasterly, the intermediate shore being generally steep-to and approachable with safety to 600 yards.

The land on Digby Neck is partially wooded, more thickly on the Bay of Fundy side than that of St. Mary, and slopes gradually toward the Bay of Fundy shore. At Sandy Cove and Gulliver Hole there are tolerably high cliffs, and the hollows through the neck at each of these places present a remarkable appearance.

Sandy Cove affords good anchorage, being sheltered from all winds between northeast round by south to southwest. Care must be taken to avoid a rock with 1 fathom of water lying 600 yards 29° from the western point of Sandy Cove, with a deep channel between it and the shore.

Tides.—High water, full and change, at Sandy Cove is at 10h. 47m.; springs rise 23 feet, neaps 19 feet.

Gulliver Hole is free from danger, and also affords good anchorage, with all winds from northeast round by south to westward.

Digby Gut is a narrow opening ½ mile in breadth, with steep acclivities on each side and a deep-water channel leading into Annapolis Basin. On the western side of the basin stands the town of Digby.

The shore on each side of the gut is rocky and steep-to for several miles, as are also the points of entrance, especially the one on the eastern side, which has deep water within a few fathoms of the shore.

Man-of-war Rock is within Prim Point, on the western shore of the entrance, about 200 yards from the high-water line, and steep-to on its eastern side.

Prim Point Light, flashing white, elevated 76 feet above high water, visible 13 miles, is exhibited from a square wooden tower, 22 feet in height, painted red and white in vertical stripes, standing near the extremity of Prim Point on the western side of the entrance to Digby Gut.

Fog signal.—From a white square building with gabled roof, situated 75 yards northeastward of Prim Point Lighthouse, is sounded a fog horn worked by compressed air.

Light and whistle buoy.—A cylindrical buoy, painted black and white in vertical stripes, supporting a whistle and lantern from which an occulting white light is exhibited, is moored 1½ miles 25° from Prim Point Light.

This buoy is a fairway buoy to guide vessels into Digby Gut during thick or foggy weather.

Victoria Beach Light, fixed white, elevated 52 feet above high water, visible 12 miles, is exhibited from a square wooden tower, 28 feet high, situated about 30 yards within the coast line of Victoria Beach and near the center of the eastern side of Digby Gut.

Fog bell.—A fog bell is erected on the eastern side of the entrance to Digby Gut.

Digby Harbor is open all the year round and well protected, but storms from the northward and westward bring in considerable sea.

A channel 200 feet wide and 16 to 20 feet deep has been dredged in a 181° direction from deep water to a point 175 yards inside the lighthouse. Two red spar buoys mark the right-hand (western) side of the channel.

Anchorage.—Temporary and good anchorage in a depth of about 7 fathoms, at a distance of 200 yards from the shore and sheltered from all winds except those between northwest through north to east-northeast, may be obtained at the entrance of the gut on the western side, about ½ mile within Prim Point Lighthouse.

The anchorage off the town is in 6 to 8 fathoms, 1,800 yards northeastward of Digby Pier. Or anchorage may be taken nearer the town in a depth of 4 fathoms, ½ mile north-northeastward of the pier lighthouse.

Digby—Wharves.—Digby Pier, 890 feet long, 50 feet wide, 45 feet deep at the head. An arm of this wharf is 350 feet long, 50 feet wide, 40 feet deep. In addition to this wharf, which is the largest, there are about 15 wharves ranging from 33 to 317 feet long, from 13 to 70 feet wide, and from 12 to 21 feet deep. These wharves are situated in various parts of the harbor.

Digby Pier Light, fixed red, elevated 30 feet above high water, and visible 7 miles, is exhibited from a square wooden lantern, surmounting a white wooden building, 29 feet in height, with sloping sides, on the end of Digby Pier. (See Light List.)

Tides.—It is high water, full and change, at Digby Gut at 11h. 0m.; springs rise 27½ feet, neaps 23 feet.

Alongshore, outside Digby Gut, the tidal current runs nearly parallel to its trend with a velocity of 1.7 to 2 knots an hour, turning inshore a little before the time of high and low water, respectively, and offshore a little later.

Through the gut the current at ebb and flood sets with a velocity of 4 to 5 knots an hour, causing various eddies and whirlpools; the truest current will be found on the eastern side.

Directions.—In approaching the land in thick weather great caution is necessary when in a less depth than 35 fathoms.

If proceeding to the anchorage near the town of Digby, steer a mid-channel course through the entrance and then keep the eastern point of entrance astern, bearing 349°; this course will lead between the outer shoal tongue of an extensive spit, at the extremity of which there is a black buoy, and the western shore, and when Bear Island appears midway between the points of entrance of Bear River, anchor in a depth of 6 to 8 fathoms.

When proceeding through the Narrows sudden guests of wind are frequently experienced, caused by the almost precipitous nature of the hills overlooking the gut. Vessels bound up the river to Annapolis should obtain the assistance of local pilots.

The town has a population of about 1,250.

Ballast ground.—Ballast may be discharged at any point in the straight line between the black and white vertically striped buoy, and the black can buoy on the northwestern extremity of Bear Island Bar. Local pilots can be obtained who make charges according to agreement.

Communication.—There is a daily regular steamer service with St. John, N. B., and the town is connected by rail and telegraph with the Canadian systems.

Storm signals.—Storm signals are hoisted at Digby.

Winchester Point Light, fixed red, elevated 72 feet above high water, visible 9 miles, is exhibited from a square wooden tower, 32 feet in height, on Winchester Point, the western entrance point to Bear River.

Buoys.—A can buoy, painted in black and white vertical stripes, and surmounted by a staff and ball, is moored 2.7 miles north-northwestward of Winchester Point Light.

The entrance to Bear River is marked by buoys, in accordance with the Canadian system; they are replaced in winter by spar buoys.

Port Wade is on the northern shore of Annapolis Basin, 3½ miles northward of Bear River, and has a wharf 1,300 feet long, with 27 feet alongside connected with the railroad systems.

Port Wade Light, fixed red, elevated 24 feet above high water, visible 6 miles, is exhibited from a square white wooden tower 23 feet high, on the outer end of the Government wharf at Port Wade.

Annapolis River.—The Annapolis River rises in Kings County and flows in a southwesterly direction between the north and south hills, through a fertile valley.

Banks dry on both sides of the river at distances varying from 200 yards to ¾ mile from the shore. Above Annapolis, which is about 10 miles up the river, the river is sinuous and encumbered with shoals. A railroad runs on both sides of the river.

Goat Island is midway between the basin and the town.

Channels.—Goat Island divides the river into two channels, that to the northward, between the island and Shafners Point being the deeper of the two, the southern channel having only about ¾ fathom at low water. There are also shoal patches of 1½ and 1¾ fathoms water in the fairway below Goat Island.

A spit, which dries in places, 3.5 miles in length and 800 yards broad, extends in a west-southwest direction from Goat Island, and a shoal, which dries, almost surrounds Goat Island to a distance of 800 yards from it, except on the southern side, where the shore of the island is clean.

Buoys.—The channel of the Annapolis River is marked by red buoys on the starboard hand and black buoys on the port hand entering; their positions can not be depended upon and they are removed during winter.

Shafners Point Light, fixed white, elevated 55 feet above high water, visible 8 miles, is exhibited from a white, square, wooden tower, 43 feet in height, on Shafners Point.

Troop Point Light, fixed red, elevated 46 feet above high water, visible 3 miles up and down stream, is exhibited from a white, square, wooden building, 32 feet in height, with sloping sides, and situated on Troop Point, on the northern bank of the river, 5.3 miles eastward from Shafners Point.

Granville Center Light, fixed red, elevated 29 feet above high water, visible 2 miles, is exhibited from a mast, 23 feet in height, with a white shed at its base, situated on the outer end of the Government wharf at Granville Center, 3 miles above Troop Point.

Annapolis Basin Light, fixed red, elevated 30 feet above high water and visible 7 miles, is exhibited from a white square wooden building, 28 feet in height, situated a short distance northeastward of the old Government pier. (See Light List.)

The town of Annapolis, which has a population of about 1,000, is one of the oldest settlements in Nova Scotia and is surrounded by a fine fruit-growing country. It contains several churches, a hotel, and schools, besides mills and manufactories. The exports are chiefly apples, lumber, and fish.

The United States is represented by a consular agent.

Anchorage.—The anchorage off Annapolis is bad, owing to the numerous eddies, which in a short time cause a vessel to foul her anchor. Vessels should moor with a swivel, or head and stern.

Communications.—There is a daily steamship service with St. John, and it is connected by railroad and telegraph with the Dominion systems.

Pilots.—As pilots for Annapolis are difficult to obtain, application should be made to the collector of customs at Digby.

Bridgetown, 17 miles farther up the river, has a population of 1,118; its exports are chiefly fruit and agricultural produce.

Coast from Digby Gut to Cape Split.—Proceeding up the Bay of Fundy, from Digby Gut, the coast takes a general trend northeastward as far as the small village of Morden or French Cross, a distance of about 43 miles, from whence it deflects more to the eastward as far as Scotsman Bay.

The land is undulating and thickly wooded, but with partial clearings, and from the shore assumes a gradual ascent, until it attains an elevation of 400 to 600 feet, at a distance of 2 or 3 miles from the sea.

To the eastward of Chute Cove this regularity of formation is diversified by perpendicular cliffs about 100 feet high, forming small bays, on the points of which settlements have been made and wharves built to facilitate shipping cordwood, which at present is the chief export. Small vessels can lie alongside the eastern side of these wharves, which act as breakwaters where they ground every tide.

Water.—The coast from Digby Gut to the eastward abounds with fresh water, which runs in streams down the slopes of the hills into the Bay of Fundy. Boats can obtain good water from the mouths of the streams after half flood.

Parker Cove Light, fixed red, elevated 22 feet above high water, visible 6 miles, is exhibited from a white wooden building, 22 feet high, at the end of a breakwater in Parker Cove.

Chute Cove (Hampton) lies about 22¼ miles to the northeastward of Prim Point Lighthouse, and may be recognized by the commencement of the cliffs.

Two piers or breakwaters extend off from near the middle of the cove. There is a post office, which is in communication with Bridgetown by means of a road.

This village, which is known as Hampton, has about 200 persons engaged in fishing and farming.

Hampton Light, fixed white, elevated 69 feet above high water, visible 14 miles, is exhibited from a white square wooden tower with sloping sides, 33 feet in height, erected on the bank about 500 feet 141° from the northeastern corner of the western breakwater.

St. Croix Bay, about 1.5 miles to the eastward of Chute Cove, is separated from it by a low green point; this bay affords the best anchorage along the coast eastward of Digby Gut.

Anchorages.—Off Chute Cove, anchor about 400 yards from the shore, in 4½ fathoms, mud, with the breakwater bearing 600 yards 115°.

In St. Croix Bay anchor with its western point bearing ¼ mile 244° from the shore, in 4 fathoms, mud.

Port Lorne Harbor is entered from the Bay of Fundy and is 26½ miles northeastward from Digby Gut. There is anchorage off this harbor in 6 to 7 fathoms of water at low tide, at a distance of from ¼ to ½ mile from the shore. The tidal current runs parallel with the shore with a velocity of from 2 to 3 knots an hour.

The flats in the harbor are dry at low tide.

There is a pier in the harbor.

The settlement consists of about 300 people, engaged in fishing and farming.

Port Lorne Light, occulting white, elevated 92 feet above high water, visible 10 miles, is exhibited from a white square lighthouse, 22 feet in height, situated near the inner end of the pier at Port Lorne.

Port George lies 6 miles to the northeastward of Port Lorne, from which live stock, potatoes, and cordwood are exported; there is a post office at this place.

Port George Light, fixed red, elevated 25 feet above high water, visible 7 miles, is exhibited from a white square wooden lighthouse, 21 feet in height, on the outer end of the eastern pier, Port George.

Wilmot Rock uncovers at half tide, and lies about 250 yards eastward of the small pier at Port George, and 300 yards from high water mark.

Tides.—High water interval at Port George is 11h. 05m.; mean range 27.8 feet, spring range 32 feet.

Margaretville Light, group occulting white, elevated 30 feet above high water, visible 10 miles, is exhibited from a square tower, 22 feet high, and painted in black and white horizontal bands; erected on the end of the extremity of the point southward of the breakwater. (See Light List.)

Margaretville Bank.—Care must be taken in approaching Margaretville to avoid Margaretville Bank, 1 mile in length and parallel with the shore, and about ½ mile off it; the shoalest part, with 2 feet water, lies 1,600 yards east-northeastward from the lighthouse.

Between the western end of the shoal, with 2 fathoms water, and the small pier there is a 3-fathom channel ¼ mile broad.

The anchorage is in 5 fathoms, sand, inside Margaretville Bank, ¼ mile from the coast, with Margaretville Point in line with the high-water mark of Port George.

The village is the most important on the southern shore of the Bay of Fundy, and has about 500 persons, engaged in fishing and farming.

Ice—Tides.—The tide rises and falls in the vicinity, 32 feet springs and 28 feet neaps. Owing to the constant fall and rise of the tide, not much ice remains in the harbor and it can generally be entered the year round.

Communication.—The place is a railroad terminus and has communication with all parts by rail.

Morden or French Cross lies 6 miles northeastward of Margaretville, and may be recognized by the square tower of its Episcopal Church; there is also a post office and a small pier alongside which vessels lie aground and ship agricultural produce and cordwood.

About 800 yards eastward of Morden Pier, and 400 yards offshore, is a small bank which dries at low water. Vessels should keep outside until there is sufficient water to pass over it.

Shoal.—A shoal with 3½ fathoms on it, lies about 1,400 yards northwest of Morden.

The anchorage near Morden is in about 6 fathoms, a short distance eastward of the breakwater.

Coast.—About 1 mile northeastward of Morden is Joliffe Head, a high perpendicular cliff of a reddish color, and farther on are two small piers, known as Ogilvie and Gibbon Breakwaters, the latter being 6½ miles from Morden.

Harborville Light, fixed white, 15 feet above high water, is exhibited on the outer end of the west pier at Harborville, about 4¼ miles northeastward of Morden.

Black Rock, from which the locality derives its name, is 8.9 miles eastward of Morden, and is 21 feet above low water, spring tides, and covers about half flood. At low water the rock dries about 200 feet outside its apex.

Black Rock Point Light, fixed white, elevated 45 feet above high water, visible 12 miles, is exhibited from a lantern on the roof of a white square building, 35 feet in height.

Canada Creek, 1 mile eastward of Black Rock, has a small pier off which a shoal with 1¾ fathoms on it extends 600 yards.

Chipman Brook, 4 miles eastward of Black Rock, and Hall Harbor, 3 miles eastward of Chipman Brook, each have a small pier.

A breakwater, 80 feet in length, extends 315° from the shore at Hall Harbor.

Hall Harbor Light, fixed red, visible 7 miles, is exhibited 33 feet above high water from a small white square wooden building on iron supports, 29 feet high, on the head of the eastern breakwater.

Shoal Point, about 1¾ miles eastward of Hall Harbor, has some rocks off it which extend ¼ mile offshore.

Anchorages between Digby Gut and Cape Split.—Vessels can anchor all along this part of the northwestern coast of Nova Scotia with winds from east, round by south to southwest, in about 12 fathoms, free from rock, at distances varying from ¼ to ½ mile from the shore.

In some of the bays a closer anchorage may be obtained, with soft bottom and greater shelter; but when the wind is strong from southwest or more westerly, the ebb tide, which runs at a velocity of 2 knots an hour along shore to the westward of Morden, renders the anchorage along the coast unfit for small vessels and they are advised to stand off and on during the ebb.

To the eastward of Morden the tidal current runs with increased rapidity, and here also, after the wind gets around to the westward and blows hard, a heavy sea comes up with the first of the flood, rendering the anchorage bad, especially for small vessels.

Vessels bound to Minas Basin arriving off Cape Split and unable to proceed through on account of the strong ebb tide may anchor on the southwestern side of the cape, about 1 mile from its extremity and 400 yards offshore in about 10 fathoms, with the outer hill of Cape Split in range with the nearest point, bearing 322°.

In the fall of the year, when gales frequently commence from the eastward and suddenly shift to the westward, the anchorage in Scotsman Bay is dangerous.

Scotsman Bay is the name given to the waters of the bight lying southward of the narrow hooklike strip of land ending in Cape Split.

Tides.—High water interval at Black Rock Point is 11h. 17m.; mean range 31.5 feet, spring range 36 feet.

Isle Haute, about 1¼ miles long and ¼ mile wide, lies 9 miles to the northward of Morden and 5½ miles to the south-southwestward of Cape Chignecto. The island attains an elevation of 320 feet, is thickly wooded, and surrounded on all sides by perpendicular cliffs, except at the eastern and western points. Its western point is formed by a steep, grassy slope, and off its eastern point is a stony spit which uncovers at low water about 700 yards. Except off this point the island is steep-to, and may be approached safely to within ¼ mile.

Isle Haute Light, fixed and group flashing white, elevated 365 feet above high water, visible 20 miles, is exhibited from a white square lighthouse, 53 feet high, on the summit of Isle Haute.

Fog signal.—A hand foghorn is sounded in answer to vessels.

Tides.—High water interval at Isle Haute is 11h. 09m.; mean range 28.9 feet, spring range 33 feet.

Anchorage.—Vessels may anchor on the northeastern side of Isle Haute, in about 12 fathoms, within the eddy and about 250 yards from the eastern point of the island.

Cape Split, the termination of a remarkable tapering promontory, forming the southern point of entrance to Minas Basin, consists of perpendicular cliffs about 200 feet high, which are divided by several deep fissures or splits, hence the name.

Two small detached rocks which just uncover at low-water springs lie off the pitch of Cape Split at the respective distances of 500 and 700 yards 308°. There is a passage between the rocks, as well as between the inner rock and the cape. During the tide a very heavy tide rip extends considerably beyond these rocks.

Cape Chignecto is the western extremity of a promontory dividing the head of the Bay of Fundy into two branches; the one to the northward, known as Chignecto Bay, leads into Cumberland Basin and the Petitcodiac River, while the southern of the two leads into Minas Basin.

The cape itself is very conspicuous, as the land in its immediate vicinity, which attains an elevation of between 700 and 900 feet, is thickly wooded and intersected by valleys. On the southeastern side the high land falls suddenly and terminates in high cliffs in many places on the shores of Advocate Bay. The shores of the cape have deep water close-to.

Cape D'Or, a low green point, 7.7 miles 106° from Cape Chignecto, is the southwestern extremity of a high ridge of land, separated from that of Cape Chignecto by a deep valley.

This ridge terminates on its western side in cliffs 200 feet high and falls abruptly toward the low point of Cape D'Or.

Fog signal.—A steam fog whistle is sounded from a wooden building, painted brown, on the extremity of Cape D'Or.

Advocate Bay, between Capes Chignecto and D'Or, affords, near its head, good anchorage with winds from west through north to east; but care must be taken to get under way when the wind hauls to the southward, as in such cases it frequently veers around to, and blows hard from, the westward.

Advocate Harbor.—From the middle of Advocate Bay a natural sea wall, composed of stones, extends almost continuously to the western point of Cape D'Or. This wall or causeway is about 10 feet above high water, but between it and the shore of Advocate Settlement, a distance of 1,400 yards, is a deep basin with a muddy bottom, which only dries 1 or 2 feet at low-water springs.

A buoyed chanel leads up to the wharf inside the bar.

Supplies are readily obtained.

Near Cape D'Or there is an opening through the causeway at high water, and vessels pass through into the basin or harbor inside, where they, of course, ground at low water, but are protected by the stony wall outside.

Advocate Harbor Light, fixed red, elevated 36 feet above high water, visible 7 miles, is exhibited from a white square wooden lighthouse, 27 feet in height, on the southern side of the entrance to Advocate Harbor.

Anchorage.—There is an anchorage near the entrance in which small craft, if moored, can lie afloat at low water. As the passage into the harbor frequently shifts during westerly gales, no vessels should attempt to enter without local knowledge.

Shoal.—Eastward of Cape D'Or the shore trends to the northward toward Horseshoe Cove and forms a point, off which lies a detached stony shoal, which dries at low water. The inner end of the shoal is close to the eastern side of the point, from whence it extends about 300 yards in a northeasterly direction.

Cape Spencer may easily be recognized by a remarkable sugarloaf rock, isolated at high water, above which it rises 20 feet. The cape should not be approached nearer than 400 yards, in order to avoid a detached rock, which dries at low water, about 200 yards offshore.

Spencer Island, small, thicky wooded, and 180 feet high, is separated from the mainland near Cape Spencer by a channel about $\frac{1}{4}$ mile broad, in which there is as little as 1 fathom water.

Spencer Island Settlement Light, fixed red, elevated 34 feet above high water, visible 7 miles, is exhibited from a square wooden lantern surmounting a white wooden building, 33 feet in height, with sloping sides, situated on the mainland at Spencer Island Settlement.

Tides.—High water interval at Spencer Island is 11h. 31m.; mean range 34 feet, spring range 39 feet. The tidal current attains a velocity of 6 knots an hour.

Anchorage.—To the northward of Spencer Island there is good anchorage, safe from all winds except those from east to south, in about 5 fathoms, mud and sand, with the eastern end of Spencer Island bearing 1,400 yards 156°. Vessels tide bound can anchor anywhere between Spencer Island and Fox Point, in about 5 fathoms, and $\frac{1}{2}$ mile offshore.

Port Grenville Range Lights—Front Light, fixed red, 22 feet above high water, is exhibited from a pole 20 feet high, with a shed at the base, the whole painted white, 15 feet from the outer end of Port Grenville Breakwater.

Rear Light, fixed white, 59 feet above high water, is exhibited from a white, square, wooden tower with sloping sides, 260 yards 334° from the front light.

The range lead up to Port Grenville Breakwater clear of all obstructions.

Tides between Digby Gut and Cape Split.—From Digby Gut to the head of Scotsman Bay the tidal current runs parallel with the shore and during the strength attains a velocity varying from 2 knots off Digby Gut to about 3 knots an hour off Black Rock Lighthouse; on nearing the head, or Scotsman Bay, the velocity diminishes.

From Cape Chignecto to Cape D'Or the flood current sets nearly straight and makes a long rip off Cape D'Or for a distance of 1 mile in a southerly direction, caused by meeting an eddy setting toward Cape D'Or along its eastern shore. Inshore between the above capes the flood current circuit of Advocate Bay, but on the ebb an eddy is formed to the westward of Cape D'Or.

At Spencer Anchorage, except about the first hour of ebb, the set tends toward Spencer Island. Round Cape D'Or and Spencer Island the tidal current runs from 5 to 6 knots an hour, and round the end of the heavy rip off Cape Split it attains a velocity of 7 or 8 knots.

Close inshore the current changes its direction a little before, and in the offing a little after, the time of high and low water by the shore. Between Digby Gut and Black Rock Lighthouse it changes inshore from 15 to 30 minutes, and to the eastward of Halls Harbor from 1 to 2 hours before the time of high and low water.

Directions.—When approaching Cape D'Or with a flood tide keep well off the cape, beyond the influence of the tide rip; if with an ebb current and a commanding breeze, round Cape D'Or close-to, but unless the wind be fair and strong it would be advisable to keep the vessel in the eddy west of Cape D'Or until the ebb current has ceased.

Minas Basin.—The entrance to Minas Basin lies between Fox Point on the north and Cape Split, the distance between these points being about 3¼ miles. The length of the basin in a straight line between Cape Split at its entrance and the town of Truro at its eastern extremity is 50 miles, with a varying and very irregular breadth.

The northern shore of the basin between Fox and Economy Points is high and varies in elevation from 250 to 400 feet, gradually rising within a few miles of the coast to a well wooded range known as the Cobequid Mountains, being a continuation in an easterly direction of the range north of Cape Chignecto.

This mountain range attains in some places an elevation of more than 800 feet; it is deeply intersected by numerous valleys, through which small rivers descend to the sea, and is also well wooded, but with partial clearings near the shore. To the eastward of Economy Point the shore gradually declines in altitude to the head of the basin.

Minas Basin receives the waters of numerous rivers, the principal being the Avon River to the southwest, into which the St. Croix and

Kennetcook Rivers discharge their waters, and the Shubenacadie River, near the head of the basin.

The southern shore of Minas Basin is bold from Cape Split to about 2 miles south of Cape Blomidon, with high, precipitous earthy cliffs, varying in elevation from 200 to 600 feet, and thickly wooded on their summits. From the above position the high ridge over Cape Blomidon slopes rapidly to the valley of Cornwallis River, where the land is well cleared and intersected by numerous valleys.

A ridge, of which Horton Bluff is the eastern extremity, separates the valleys of Cornwallis and Avon. To the eastward of Avon River the land is intersected by valleys, thickly wooded in some parts, and partially cleared in others.

Kingsport Light, fixed white, elevated 27 feet above high water, visible 10 miles, is exhibited from a white square wooden house, 23 feet high, at the outer end of Oak Point Pier, situated 8 miles 191° from Cape Blomidon.

Foghorn.—A hand foghorn is sounded in answer to vessels.

Kingsport is connected by telegraph.

Porters Point Light, fixed red, elevated 29 feet above high water, visible 5 miles, is exhibited from a white square wooden building, 27 feet in height, on piles, on the northern extremity of Porters Point, on the southern side of the entrance to Canning River.

Bordens Wharf Light, fixed red, elevated 26 feet above high water, visible in the straight reaches of the channel to the northward and eastward, is exhibited from a white square wooden building on piles, 27 feet in height, situated at Bordens Wharf, on the southern side of Canning River.

The channel within Kingsport is marked by dolphins.

Wolfville, at the mouth of Cornwallis River, with a population of about 2,000, is a popular resort, surrounded by a rich farming country. Its chief exports are fruit and farm produce.

Communication.—A telegraph and railroad connect it with the Canadian systems.

Wharves.—There are four wharves and a Government pier. This pier is about 100 feet long and 40 feet wide, with a depth of water of 30 feet at highest tides, and at the other wharves the depth is 20 feet at highest tides. On these wharves are freight sheds. Two railroad sidings lead to the latter wharves.

Anchorage.—Off Cornwallis River the best anchorage is in a depth of 5 to 6 fathoms sand, with Kingsport Light bearing 316° 3½ miles and Horton Lighthouse bearing 148°, seen just open eastward of Boot Island. This anchorage may be considered good with all but northeasterly and easterly winds, and when approaching it care should be taken to avoid shutting in the western point of Partridge Island with Cape Blomidon.

Wolfville Light, fixed red, elevated 20 feet above high water, visible 6 miles, is exhibited from a square wooden lighthouse 22 feet high on the northwestern corner of the Government wharf at the junction of Mud Creek and Cornwallis River at Wolfville.

Avon River.—The approaches to Avon River are rendered difficult on account of extensive flats, which, from the nature of the bottom and velocity of the tides, must be continually shifting their position; no detailed description is therefore given; and as the channels between are narrow and circuitous, without any well-defined leading marks, it is absolutely necessary that strangers should obtain the services of a local pilot.

Depth.—The least depth over the bar, according to the chart, is 1½ fathoms at low water springs.

Cross Bars Shoal Light Buoy, a cylindrical buoy, painted black and white in vertical stripes and surmounted by a pyramidal frame supporting a lantern from which an occulting white light is exhibited, is moored in 4½ fathoms water 400 yards northward of the edge of Cross Bars Shoal. It is withdrawn annually between December 1 and 15 for the winter.

Two conical red and one black can buoy mark the channel from the light buoy up to Horton Bluff. There is a conical red buoy on the eastern side of the Middle Ground, marking the channel up to Cheverie Point, and a red spar buoy marking a rock off the wharf at that point.

Horton Bluff.—There is anchorage in 7 fathoms about ½ mile north-northeastward of Horton Bluff.

Horton Light, fixed white, elevated 100 feet above high water, visible 15 miles, is exhibited from a white square building, 33 feet in height, standing on Horton Bluff, on the western side of the entrance to Avon River. The lighthouse is connected by telegraph.

Cheverie Light, fixed white, visible 9 miles, is exhibited at an elevation of 22 feet from a pole 20 feet high, with a shed at its base, erected near the inner end of the wharf at Cheverie, on the eastern side of the entrance of the Avon River.

Tides.—High water interval at Horton Bluff is 12h. 21 m.; mean range 42 feet, spring range 48 feet.

Anchorage.—There is good anchorage for vessels of 15 feet draft off the mouth of the Avon River.

Directions.—If circumstances render it necessary to reach the anchorage at the entrance of Avon River, without the assistance of a pilot, steer with Cape Blomidon bearing 331° astern, and pass between Cross and Western Bars (this course, according to the chart, will lead across a depth of 1½ fathoms at low water) until Horton Lighthouse bears 169°; then steer for it on that bearing, and either anchor near Horton Buoy or pass close to it, and when the wooded point eastward of Horton River is in range with the highest point of Long Island anchor in about 7 fathoms.

Hantsport is situated on the Avon River, the lower part of which is practically an arm of Minas Basin. In ascending the river to Hantsport, local pilots are necessary for strangers. The depth of water at low water ranges from 1 to 3 fathoms opposite the entrance to Hantsport. There are repair blocks in this harbor, and steamers call at the wharves on their way to the ports on Avon River.

Mitchener Point Lights.—A fixed white light, visible 3 miles, is exhibited 42 feet above high water from a white square wooden tower with sloping sides, surmounted by a square wooden lantern, erected on a square cribwork foundation 8 feet high, standing on the marsh southward of Mitchener Point.

A fixed red light is shown from a window on the southern side of the tower below the lantern in such a manner as to indicate to vessels bound down the St. Croix River the exact turning point at the junction of the St. Croix and Avon Rivers.

Avon River Bridges—Lights.—Bridges span the Avon River near Windsor, and the following lights are exhibited for the guidance of vessels:

Light No. 1, on the highway bridge, 262 feet from its eastern end.

Light No. 2, on the Canadian Pacific Railway bridge, 321 feet from its eastern end.

Light No. 3, on the Canadian Pacific Railway bridge, 170 feet from Light No. 2 and 491 feet from the eastern end of the bridge.

Each light is fixed red, electric, and elevated from 18 to 20 feet above high water.

In navigating the Avon River below the highway bridge the light on the highway bridge should be kept in line with the eastern light on the railroad bridge. In navigating the river above the bridges the western light on the railroad bridge should be kept in line with the light on the highway bridge.

Windsor.—The town of Windsor, with a population of about 3,500, stands at the confluence of the Avon and St. Croix Rivers.

Windsor has railroad and telegraph communication with the Canadian system.

Products.—Gypsum in large quantities, gold, manganese, and antimony are found in the neighborhood. The chief shipments are cottons, gypsum, lumber, and fish.

Wharves.—There are 12 wharves extending along the river front 2,300 feet with average depths of 12 feet alongside them at high-water springs and 6 feet at high-water neap tides, but it may vary as much as 2 feet; it is dry alongside them at low water.

There are railroad sidings at the Government Wharf and at Mosher Wharf, with sheds convenient for handling freight by rail to and from vessels.

Repairs.—There are no docks for repairs at Windsor, but at Hantsport, 7 miles from Windsor, there are good marine blocks on which to repair vessels, and also at Summerville, 8 miles from Windsor.

Minasville Light, fixed white, visible 8 miles, is exhibited, 26 feet above high water, from a pole 25 feet high, with a shed at its base, all painted white, erected on the wharf at Minasville, 40 feet from the outer end.

Hogback Shoal, the southern part of which dries, the center of this part being 8 miles 22° from Horton Bluff Lighthouse in range with Cheverie Point; it is narrow and sandy, shoal, nearly 3 miles in length, and lies parallel with the southern shore at a distance of about 1¾ miles from it.

Its southern side is separated from Cambridge Flats by a channel nearly 1 mile broad, in which the depth is 2¼ to 4 fathoms.

Walton Light, group occulting white, elevated 60 feet above high water, visible 13 miles, is exhibited from a white square building, 20 feet in height, standing on the eastern side of the entrance to Walton River.

Walton Bar, composed of sand, lies a short distance eastward of the town of Walton, and dries at a distance of 1¼ miles offshore.

Between Walton Bar and Burncoat Head, 7¼ miles eastward, the low-water mark extends about ½ mile offshore.

Burncoat Light, fixed white, elevated 76 feet above high water, visible 13 miles, is exhibited from a white, square, wooden lighthouse, with a red iron octagonal lantern rising from the middle of the hip roof, the whole 39 feet high from base to ventilator on the lantern, erected 500 feet eastward of the old lighthouse on the northwest extremity of Burncoat Head.

Tides.—High-water interval at Noel Bay, just to the eastward of Burncoat Head, is 0h. 07m.; mean range 44.2 feet, spring range 50.5 feet.

Tennycape Wharf Light, fixed white, 26 feet above high water, visible 8 miles, exhibited from a white wooden pole 25 feet high, with a white wooden shed at its base, is erected on the outer end of Tennycape Wharf, which extends out from the western side of the mouth of Tennycape River.

Cape Sharp derives its name from a remarkably sharp eminence, 300 feet high, with which it terminates; it is 5¼ miles from Fox Point, and with the shore of the Cape Split Promontory, from which it is distant only 2¾ miles, forms the narrowest part of the entrance to Minas Basin.

Cape Sharp Light, occulting white, elevated 60 feet above high water, visible 13 miles, is exhibited from a white square wooden tower, 34 feet in height, on the southern extremity of the cape.

Fog signal.—A diaphone horn is sounded. The fog signal house, which is a rectangular-shaped building painted white, with a red roof, stands 75 yards north-northwestward of the lighthouse.

Black Rock, 15 feet above high water and of small extent, lies ½ mile from the nearest shore, and ¾ mile 277° from Cape Sharp. A deep-water channel exists between Black Rock and the shore, but as the tidal currents set directly on the rock this passage should never be attempted.

West Bay is about 2 miles across between Cape Sharp on the west and Partridge Island on the east, and ¾ mile in depth. Nearly the whole of the bay is occupied by a shoal bank of sand and gravel; the shoalest part, having 1¼ fathoms water, lies a little on the eastern side of the middle of the bay and 700 yards offshore, with Cape Split just shut in with Cape Sharp.

There is 3½ fathoms (reported) ½ mile eastward of Cape Sharp, and not less than 3 fathoms on other parts of this bank, while within it, about ¼ mile from the shore, is a narrow belt of deeper water with 5 or 6 fathoms.

Anchorage.—West Bay affords good anchorage toward its western side in a depth of about 6 fathoms mud, ½ mile east-northeastward of Cape Sharp, protected from all winds, save those from east-northeast to south, but care must be taken to avoid the 3½ fathoms reported above.

Steamers and sailing vessels load lumber in West Bay for Great Britain and other countries.

Tides.—High water, full and change, in West Bay is at 12h. 4m.; springs rise 45 feet, neaps 35 feet. The tidal current, except for about one hour after low water, sets toward Cape Sharp.

Partridge Island, though small in extent, attains an elevation of 240 feet. It is connected by means of a gravel neck to the shore. The anchorage eastward of this island is not good.

Parrsboro Harbor is at the head of an indentation in the Bay of Fundy, 3 miles eastward of Cape Sharp. The inner harbor is dry at low tide and the average tide is 17 or 18 feet, and at high tide 26 to 27 feet. Large vessels load at West Bay, a distance of about 4 miles. Lumber is carried out to large vessels by schooners.

Wharves.—The wharf accommodation at Parrsboro is about 300,000 square feet, all of which is reached by railroad. Besides the above area, the Cumberland Railroad & Coal Co. has a shipping wharf for coal which is about 1,000 feet long by 40 feet wide at the head; the depth of water at high tide springs is 34 feet, neaps 28 feet.

Steamers coal in the inner harbor for ports in the Bay of Fundy and elsewhere.

Repairs.—There is one set of good marine blocks at Parrsboro for repairing vessels as large as 1,500 tons.

Supplies.—Supplies are readily obtained.

Parrsboro Light, fixed white, elevated 37 feet above high water, visible 9 miles, is exhibited from a white square tower, 32 feet high, on the eastern extremity of a low sandy spit on the western side of the mouth of Parrsboro River.

Fog signal.—A bell is struck by machinery. The bell is situated in a framework tower on the southern side of the lighthouse.

The town of Parrsboro, with a population of about 2,800, has sawmills, and factories, shipbuilding yards, and a repairing slip; it is situated at the head of an indentation in the coast about 3 miles eastward of Cape Sharp and is connected by a railroad and telegraph with the Canadian system.

The chief shipments consists of coal, leather, fish, and lumber.

Coal—Supplies.—Coal and supplies can be easily obtained.

Parrsboro River can only be entered about one hour before high water, and when within the lighthouse, vessels can lie on the mud at low water in perfect safety.

Parrsboro Wharf Light, fixed red, consisting of a group of three 16-candlepower electric lamps suspended 24 feet above the water from the corner of a freight shed, is erected on the extremity of the Government wharf.

Sand Point Light, fixed white, elevated 43 feet above high water, visible 11 miles, is exhibited from an inclosed white square wooden tower, with sloping sides, surmounted by a square lantern, erected near the extremity of Sand Point, western entrance to East River, Five Islands, Minas Basin.

Frazers Head, next eastward of Partridge Island, is 390 feet high, and with the exception of two hardwood trees close together is quite bare. The south rounding of the head should not be approached within ¼ mile.

The Brothers, two small thickly wooded islands, 260 feet high, situated about 1.3 miles eastward of Frazers Head, are both included within the low-water line of the main shore. A small patch of rocks, which uncovers at low water springs, lies 125° about 700 yards distant from the southern extremity of the southern Brother Island.

Five Islands extend in almost a straight line westerly from the western end of Red Head, the westernmost being nearly 3½ miles distant. The eastern island is much the largest of the group, thickly wooded, and attains an elevation of 350 feet, with steep earthy cliffs on its southern shore. These islands are nearly joined to each other and the main at low water. Between Five Islands and Economy Point the cliffs bordering the sea attain in some parts considerable heights and are remarkable from being red.

White Rock, so called from its appearance, is 10 feet above high water, and is in range between the eastern of the Five Islands and the southwest tangent of Economy Point, being about 4.3 miles from the former.

Brick Kiln Island, very small and about 50 feet high, with red cliffs, lies about 2.5 miles 263° from Economy Point, on the margin of the low-water line.

Brick Kiln Ledges are two in number, with their centers bearing 249° from Economy Point, from which the western ledge, which uncovers 2 hours before low water, is 3 miles. Between this ledge and White Rock are numerous rocks, and strangers are advised to avoid their locality.

Economy River is nearly 3 miles to the eastward of White Rock. Vessels of 15 feet draft can proceed to the sawmills at ordinary high water and those of 19 feet draft at high-water springs.

Economy River Light, fixed red, elevated 15 feet above high water, visible 5 miles, is exhibited from a mast 30 feet in height, on the northern side of the entrance to Economy River. This light is only shown during the fishing season.

Economy Point, on the northern shore, is nearly 21½ miles 94° from Cape Sharp and 4 miles 304° from Burncoat Lighthouse.

Head of the basin.—Between Burncoat Lighthouse and Economy Point is the eastern limit of what may be termed general navigation, nor should this line be passed by any vessel unless in charge of a local pilot, as farther up the basin are many shoals formed of loose shifting sand, which are constantly altering their position. Eastward of the line of limit of general navigation just mentioned the basin extends in a east-southeasterly direction to the town of Truro at its head, which is about 24 miles from Economy Point.

Noel Bay Light, fixed red, elevated 27 feet above high water, visible 6 miles, is exhibited from a square wooden tower, 27 feet in height, the upper part painted white and lower part sanded, situated on the outer end of the Government Breakwater, Noel Bay.

Salters Head Light, fixed red, elevated 60 feet above high water, visible 5 miles, is exhibited from a mast, 20 feet in height, surmounting a white shed, on Salters Head, on the western side of the entrance to the Shubenacadie River.

Maitland Light, fixed white, elevated 24 feet above high water, visible 7 miles, is exhibited from a pole on the Government wharf, Maitland, western side of Shubenacadie River entrance.

Bass River Light, fixed red, elevated 39 feet above high water, visible 7 miles, is exhibited from a white square wooden tower, 32 feet in height, about 130 yards northward of, and within, the western entrance point of Bass River.

Portapique River Light, fixed white, elevated 28 feet above high water, visible 10 miles, is exhibited from a white square tower with sloping sides situated at the eastern side of Portapique River.

Highland Village Light, fixed red, elevated 35 feet above high water, visible 7 miles, is exhibited from a pole 30 feet high; erected at Highland Village, situated midway between Portapique River and Spencer Point.

Spencer Point Light, fixed white, elevated 35 feet above high water, visible 11 miles, is exhibited from an octagonal lantern rising from the roof of a rectangular, white, wooden dwelling, on the southeastern extremity of Spencer Point. The light is only exhibited during the period of navigation.

Folly River Light, fixed red, elevated 25 feet above high water, visible 6 miles, is exhibited during the fishing season from a mast 20 feet in height, on the western side of the entrance to Folly River.

Moss Creek Light, fixed red, elevated 30 feet above high water, visible 6 miles, is exhibited during the fishing season from a mast 20 feet in height, standing on the eastern side of the entrance to Moss Creek.

Tides in Minas Basin.—Since the great rise and fall, as well as the velocity of the tides, form such important elements in the navigation of Minas Basin, it is essentially necessary that both should be carefully studied by seamen entering the basin.

In the passage to Minas Basin, near the Cape Split shore, the tidal current attains a velocity of 7 to 8 knots an hour, but in the center and near the northern shore it decreases to 5 or 6 knots. Between Cape Split and the head of the basin the velocity varies from about 3 knots in the wider parts to 4 knots where the channel contracts, its direction being modified by the trend of the land.

Directions.—In navigating Minas Basin seamen must bear in mind that the various banks and bars are as a rule composed of loose shifting sand, and that rapid currents and strong winds cause them to alter their positions, especially after heavy gales and in the spring on the breaking up of the ice.

From the fairway between the tide rip off Cape Split and Fox Point steer 103° until abreast Cape Sharp, whence, if bound to Parrsboro River, steer to round Partridge Island at a moderate distance; keep Cape Split in sight until Parrsboro Lighthouse bears 339°, when steer for it and pass close round to the eastward of the spit on which the lighthouse stands. This river can only be entered about one hour before high water, and when within the lighthouse vessels can lie on the mud at low water in perfect safety.

If bound up the basin, after passing Partridge Island steer about 91°, and when Parrsboro Lighthouse bears 288° keep it on that bearing and steer 108°, until Burncoat Lighthouse bears 91°, when steer for it on this bearing, which will lead southward of Brick Kiln Ledges, until abreast Economy Point, beyond which the services of a pilot should be obtained.

In moderate weather vessels may anchor along the shores of Minas Basin, but on the northern shore the bottom is hard, and the anchorage is inferior to that on the southern side. Vessels may also ascend various small rivers, but the latter can only be entered at high water, and as a matter of course vessels are dry at low water.

CHAPTER IV.

NOVA SCOTIA, SOUTHEAST COAST.—PORT LATOUR TO SAMBRO HARBOR.

Coast.—The seaboard of the southeast coast, from Cape Sable to Cape Canso, is about 230 miles in a straight line, the general trend being northeastward. Throughout the whole extent of this rocky coast are numerous indentations, varying in size and utility from the narrow creek in which boats seek shelter to large harbors, of which Halifax is the largest, most accessible, and safest.

The coast is fringed by numerous islands and sunken dangers which, by breaking the sea, tend to facilitate the progress and promote the safety of the local coasting trade, but to insure its successful prosecution local knowledge of the coast and its dangers is indispensable, the more so as the fogs—of a density seldom experienced elsewhere—are very prevalent during the greater part of the year.

Brazil Rock is a dangerous off-lying rocky shoal having only 2 fathoms over it, with deep water close-to; the sea breaks heavily on this rock in bad weather, but during fine weather it is only marked by a tide rip. It has deep water around it. From the rock Baccaro Lighthouse bears 349° 5½ miles, and Cape Sable Lighthouse 248° 7¾ miles.

The tidal currents rush with great rapidity over the above rock and create a considerable rip.

Light and whistling buoy.—A whistling buoy, painted red and black in horizontal stripes, with " Brazil Rock " in white letters, and showing an occulting white light, is moored in 21 fathoms ½ mile 173° from Brazil Rock, and about 6 miles 170° from Baccaro Lighthouse.

Submarine bell buoy.—A submarine bell buoy is moored 200 yards 342° from Brazil Rock Light and Whistle Buoy.

The buoy is cylindrical, surmounted by a pyramidal steel frame, with an openwork bell-shaped topmark.

Bantam Rocks, which uncover at low-water springs, are 100 yards apart, and form the highest part of a dangerous rocky ledge nearly ¼ mile in length. From the rocks, which nearly always break, Baccaro Lighthouse bears 30° 1¼ miles.

Whistling buoy.—A red whistling buoy is moored ¼ mile 207° from Bantam Rocks.

Port Latour lies between Baccaro Point on the west and Blanche Island on the east.

The port is a bight open to the southward, but in consequence of its numerous dangers, shallow water, and bad anchorages is only used by small fishing vessels.

Harbor.—The shipping at this port is mostly local, as only light draft vessels carrying not more than 13 feet can enter the harbor at low tide. The harbor is quite extensive and affords good anchorage, the bottom being soft mud or sand and the depth of water 14 to 15 feet within the harbor proper.

Wharves.—There are four wharves and one breakwater or pier, the latter being some 500 feet in length; it protects a portion of the harbor and is also used as a wharf; depth of water, 14 feet alongside at low tide.

There is a Government wharf with one warehouse and coal shed.

At all these wharves 6 to 7 feet of water will be found at low tide. Tide rises ordinarily 5 to 6 feet. The bottom is soft.

Buoys.—There are three entrances marked by 16 spar buoys.

Extreme caution must be used in entering this port, as there are several dangers.

This harbor is open and has steamer service the year round.

Anchorage.—The anchorage proper in 3¼ to 3½ fathoms is farther up the inlet, eastward of Johns Island and northward of Rain Island, but it is small and studded with rocks, and should not be attempted by any but those possessed of good local experience.

As it is possible vessels may seek to obtain anchorage within Port Latour, a description of the dangers off its entrance are given.

Baccaro Point.—Baccaro Point is 6½ miles 233° from Negro Island Lighthouse.

Baccaro Point Light, fixed and group flashing white, elevated 49 feet above high water, visible 12 miles, is exhibited from a square building, with a white tower, 35 feet in height, having a black ball on its seaward face, on the extremity of the point.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

Shot Pouch is a rocky shoal 400 yards in extent, the center being about 700 yards 238° from Baccaro Lighthouse.

Cuckold Rock, awash at low-water springs, is a small detached rock between South Ledge and Baccaro Lighthouse; it lies about 1,400 yards 65° from Baccaro Lighthouse.

A black spar buoy has been established in 6 fathoms of water 100 yards 142° from Cuckold Rock.

Baccaro Outer Ledge, about ¼ mile long, and with 8½ fathoms on its shoalest part, lies 1½ miles 114° from Baccaro Lighthouse.

South Ledge consists of several rocks, the southwesternmost of which is always seen, and from it the northern rock which uncovers at a quarter ebb, bears 5° 300 yards and 1¼ miles 80° from Baccaro Lighthouse.

Stone Horse, at the eastern end of South Ledge, has only ¾ fathom of water and is ¼ miles 100° from the southern rock of South Ledge.

A black can buoy, with "Stone Horse" in white letters on the top, is moored in 14 fathoms of water about 250 yards 128° from Stone Horse Shoal, eastern end of South Ledge.

North Ledge, about ¼ mile long, has on its northern end a rock 3 feet above high water, and on its southwest end is a small rock which is awash at low water. From the latter rock the high-water mark, northward of Baccaro Point, is ¾ mile.

Page Islet, near the southeastern extremity of an extensive bank to the southward of Port Latour, is 25 feet high, and 2¾ miles 16° from Baccaro Lighthouse; shoal water extends in an easterly direction for nearly ¼ mile from the island.

Bell buoy.—A fairway bell buoy, painted black and white in vertical stripes with "Latour Fairway" on the deck, is moored in 22 fathoms of water 3¾ miles 145° from Page Island Lighthouse.

Page Island Light, fixed white, elevated 46 feet above high water, visible 12 miles, is exhibited from a white square wooden structure, 34 feet in height, with a red lantern, on the eastern end of the islet.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

Buoys.—The following buoys mark shoals in the channel leading up to the anchorage on the eastern side of Johns Island:

A red spar buoy is moored off the western end of Williams Ledge, on the eastern side of the channel, about ½ mile 150° from Rain Island.

A red spar buoy is moored on the western side of Tea Table Rock, about ¾ mile northward of Williams Ledge and about 700 yards northeastward of Rain Island.

A black spar buoy is moored on the eastern side of Cream Crock Rock, which lies about 300 yards off the eastern extremity of Johns Island.

Anchorage.—There is good anchorage in Northeast Harbor and it is almost free from rocks and shoals. Both Northeast and Negro Harbors are commonly used by fishing vessels.

Wharves.—There are two small wharves on the eastern side, with 15 feet of water.

Supplies.—Supplies and water can be obtained readily.

There are railroad and steamer connections with other parts of the Province.

Negro Harbor, next eastward of Port Latour, derives its name from Negro Island at its entrance. At the head of the harbor the Clyde River flows into the inlet; here several mills are established, from whence a small quatity of lumber is exported.

A buoyed channel leads up to the public wharf at the head of the harbor.

Water can be obtained in small quantities.

There are two channels into the harbor, but both are rendered difficult in consequence of numerous dangers.

The anchorage, however, is safe in all weathers for vessels of moderate draft, and, though not so accessible as Shelburne, may be of service to vessels requiring shelter.

There is a lifeboat and station at Blanche, western entrance to Negro Harbor.

West Entrance.—**The Salvages,** a line of rocks nearly 2 miles long, north-northeast and south-southwest, are the southernmost dangers to be avoided on approaching Negro Harbor from the westward; on their southwestern end are two clusters of rocks, the highest parts of which are 10 feet above high water.

The southeast side of this extensive group of rocks is steep-to, which increases the danger of approaching during thick weather or at night.

Fog signal.—A diaphone fog signal, operated by compressed air, is sounded.

The fog signal is installed in a rectangular concrete building, with a flat roof painted white, on Salvages Rocks.

Northeast Rock.—The extreme northeastern rock of The Salvages uncovers only at low-water springs, but generally shows a break during heavy weather; it lies with Green Point (Port Latour) in range with Sheep Ledge, 251°, but there is no good cross mark.

Triangle Rocks are three distinct rocks nearly equidistant from each other occupying a central position in the western channel into Negro Harbor; the two western rocks show at low-water springs, but the eastern rock is covered by ½ fathom, with deep water all around. From the southern rock Cape Negro is just in range with a high-water tangent next westward of the cape.

The channel between Mackerel Rock and the nearest of the Triangle Rocks is less than 400 yards across between the 5-fathom curves, while the passage between the southern Triangle Rock and Shag Rock is about 700 yards.

Northeast Harbor is situated on the eastern side of the inlet and northward of Negro Island. There are two channels to the inlet, one on the eastern side of the island and one on the western. The eastern has from 14 to 18 fathoms depth of water gradually decreasing to 4 fathoms at the northern end of the island; the western from 4 to 10 fathoms. The channel northward from the island toward the harbor varies from 4 to 5 fathoms in depth, all at low water.

Buoys.—The channel in the harbor is well buoyed, having five starboard hand buoys entering and two port hand buoys.

Negro Island, 2.2 miles long, attains a greater elevation than the adjoining coast, and is of a somewhat remarkable appearance, as it is nearly divided in two, the connecting link being a low, narrow shingle causeway. On its southern end is Cape Negro, dark and rocky, from whence a barren slope rises to a conspicuous fringe of dark fir trees on the summit of the island.

From the northwestward point of the island a long shingle spit extends 800 yards northwestward; it is covered at high tide, but has deep water close to its outer end. The northern tangent of the southeastern division of Negro Island, open of the northern tangent of the northwestern division, leads northward of the spit.

Off the southwestern end of the island, at a distance of ¼ mile, are some small rocks which uncover at low water; and off the intervening point between the northwestern and southwestern extremities of the island is Mackerel Rock, always above water, and very useful as a mark of the western channel.

Negro Island Light, flashing white, elevated 90 feet above high water, visible 15 miles, is exhibited from a white octagonal reinforced concrete tower, with sloping sides, surmounted by an octagonal lantern with red roof, the whole 44 feet high, erected 400 feet back from the water's edge on the southeastern edge of Negro Island.

A rectangular wooden dwelling painted white, stands 300 feet westward of the lighthouse.

Negro Harbor range lights.—Two fixed white lights for entering Negro Harbor, are exhibited on the eastern side of the harbor, between John Point and Shingle Point. The front light is elevated 34 feet, visible over a small arc only, and shown from a tower 34 feet; it is not visible over the west entrance. The rear light is elevated 44 feet, and shown from a tower 44 feet high, situated 280 yards 297° from the front light.

These lights, which are visible 11 miles, are shown from white square wooden towers, and, in range 297°, lead through the east entrance. (See Light List.)

Entering by west entrance the rear light only is visible. Brought to bear 351°, it leads up from Shag Rock through mid-channel.

Whistle buoy.—An automatic whistling buoy, painted in black and white vertical stripes, is moored in 21 fathoms of water 1½ miles 110° 45′ from Budget Rock and on the alignment of Negro Harbor Range Lights, eastern entrance to Negro Harbor.

Gray Rocks, 800 yards in length, lie 1,400 yards southeastward of East Point; they are nearly all above water. the largest near the southern end being 10 feet above high water, and steep-to on its southern side.

A rock with ½ fathom of water over it lies about ¼ mile east-northeastward of the southernmost of the Gray Rocks.

Cape Negro, the southwestern point of Negro Island, is dark and rocky, and from it a barren slope rises to a conspicuous fringe of dark fir trees on the summit of the island.

Budget Rock, covered by ½ fathom water, generally breaks with a moderate swell, and occupies nearly a central position in the passage between East Point and the northern end of the outer part of Negro Island; on the northern side Budget Rock is steep-to, but on the island side of the rock there is a gradual slope.

The channel.—The actual channel, northward of Budget Rock, in which the depth is 8 fathoms, is narrowed to less than 400 yards by some detached low-water rocks off East Point. Between Budget Rock and a shoal point extending from Negro Island is a narrow channel with 4 fathoms, but it should not be attempted by a stranger.

Dangers.—There are several other dangers on the northern side of the eastern passage, such as Grog Rock, on the eastern side of the entrance to the shallow bight known as Northeast Harbor, and Bartlett Ledge (which just covers at high water), on the western side of the entrance, but there are no good cross marks for these dangers.

Tides.—High water interval at Negro Harbor is 7h. 49m.; mean range 5.7 feet, spring range 7 feet.

Directions—Western entrance.—Approaching from the westward, give the southern end of The Salvages a berth of ½ mile, and when Cape Roseway Lighthouse is seen just open of Cape Negro, bearing 27°, proceed on that bearing until Purgatory Point appears just in range with Mackerel Rock bearing 317°, when steer on the latter course until the southwestern point of Negro Island bears 106°; then steer 298° between Mackerel and Triangle Rocks, and when the rear lighthouse near Shingle Point bears 351° steer for it until abreast Purgatory Point; when the eastern point of Davis Island bears 322° steer for it and anchor on the eastern shore in about 3½ fathoms, mud, with the northeastern point of Negro Island apparently just in range, or shut in by Shingle Point.

If desirous of passing southward of Triangle Rocks, and having Cape Roseway Lighthouse just open of Cape Negro, as before, bring Shag Rock to bear 280° and steer 288°, which will lead in mid-channel between the southern Triangle Rock and Shag Rock, and when the rear lighthouse near Shingle Point bears 351° proceed past Purgatory Point for the anchorage, according to previous directions.

Cape Negro, open of the high-water tangent next westward of the cape, is a good mark for keeping southward of the southern rock of the Triangle Group.

Eastern entrance.—The Gray Rocks may be rounded within 200 yards, after which proceed with the lighthouses near Shingle Point in range bearing 297°. This course will lead in mid-channel between Budget Rock and the rocks off East Point.

When Cape Roseway Lighthouse appears in range with the eastern tangent of East Point, Budget Rock will have been cleared; continue on the range until Purgatory Point bears 271°, when steer for it on that bearing, passing northward of the 3-fathom patch 600 yards off the coast of Negro Island, until within ½ mile of the point, or until the eastern point of Davis Island bears 322°, steer for it, and anchor on the eastern shore as before mentioned.

Coast.—Cape Roseway Lighthouse is about 6¼ miles 34° from East Point, and between these points are several indentations, as well as Gull Rock and Gray Island, which need no further description than can be obtained from the charts.

Shelburne Harbor is situated in the eastern arm of an inlet and is entered from the Atlantic Ocean. The entrance of the port is between Government Point on the mainland and Cape Roseway, McNutt Island. The harbor is safe, commodious, and easy of access. The depth of water ranges from 7 fathoms in the inlet to 2 fathoms near the wharves. There is safe and convenient anchorage for vessels seeking temporary shelter about ½ mile northward of Sand Point. Adamant Shoal, about 1,400 yards in extent, lies nearly in the middle of Shelburne Harbor, but two channels exist, each of which can be safely taken.

Navigation is generally open all the year round.

Wharves.—There are seven wharves, with lengths varying from 100 to 925 feet, and depths alongside of from 12 to 30 feet at low water.

Anchorage.—Anchorage is obtained almost anywhere in the harbor northward of Adamant Rock, with soft mud; depth of water from 6 to 7 fathoms.

McGowans Wharf Light, fixed red, elevated 30 feet above high water, visible 7 miles, is exhibited from a pole on McGowan's Wharf.

The town has a population of about 2,000; it contains several churches, one hotel, and some schools, wood and sawmills, two shipbuilding yards. Fishing is the principle industry.

Communications.—There is a weekly steamer to Halifax. The town is connected by railroad and telegraph with the Canadian Systems.

Suppies.—Provisions, ships' stores, and water, can easily be obtained.

McNutt Island, off the entrance to Shelburne Harbor, is nearly 3 miles long by about 1½ miles wide, and near its center attains an elevation of 130 feet. Between the eastern side of the island, which is steep-to, and the mainland, is a broad, clear channel leading to Shelburne Harbor, but the passage on the western side is rendered impassable by an extensive shallow bar, on which in some places there is only 1 foot at low water.

Cape Roseway, the southeastern extremity of McNutt Island, is a remarkable white granite cliff.

Cape Roseway Light, flashing white, elevated 120 feet above high water, visible 17 miles, is exhibited from an octagonal stone lighthouse, 77 feet in height, painted in alternate vertical stripes of black and white, erected on the cape.

Fog signal.—A compressed-air diaphone is sounded from a square white wooden building with a gable roof, standing 90 feet southward of the lighthouse.

Light and whistle buoy.—A cylindrical buoy, painted black and white alternately in vertical stripes, marked "Shelburne," in white, and surmounted by a whistle and lantern, from which an occulting white light, eclipsed at short intervals, is exhibited, is moored in 18 fathoms 2.9 miles 94° from Cape Roseway Lighthouse.

Tides.—High water, full and change, at Shelburne is at 8h. 4m.; springs rise 7 feet, neaps 5½ feet.

Directions.—When approaching the entrance to Shelburne Harbor from seaward, shape course for Shelburne Light and Whistle Buoy, or with Cape Roseway Lighthouse in sight, it can be steered for in safety between the bearings of 359° and southward of 269°; the former will clear Jig Rock and the latter Bull Rock; both rocks are marked by a black bell buoy.

On nearing McNutt Island steer to pass mid-channel between the island and the mainland; after passing the northern end of the island proceed to the southward of Middle Rock by bringing N. E. Bluff astern, bearing 135°, until abreast Surf Point, thence steer to pass in mid-channel between Sand Point and the land on the western shore. From abreast Sand Point to pass eastward of Adamant Shoal steer to the northward, keeping Grey Island open of Surf Point Bowlder, bearing 171°, until past the danger, then select an anchorage as most convenient on the eastern side of the harbor.

If wishing to round Adamant Shoal on its western side, and being in a mid-channel position abreast Sand Point, steer along the western shore, with Surf Point Bowlder apparently just in range with the southwest high-water line of McNutt Island, bearing 159°, and when Churchover Church Tower comes in range with the end of Durphy Wharf alter course to 44°, bearing in mind that the white house, before alluded to, open southeastward of the Episcopal Church Tower, bearing 21°, clears Hart Point Rock and all dangers on the western shore between Hart Point and the town of Shelburne.

Anchorages.—The inner anchorage is in 6 fathoms, mud, about 1 mile southward of the town, but anchorage may be obtained almost anywhere off the eastern shore of the harbor northward of Adamant Rock.

There is a safe and convenient anchorage for vessels seeking temporary shelter about ½ mile northward of Sand Point (which should not be neared within 400 yards), in about 5 fathoms, mud, with Red Bank on McNutt Island in range with Sand Point, bearing 149°; this mark also leads to the westward of Man-of-war Rock.

Jig Rock, on which there is a depth of 1¼ fathoms, which breaks in a heavy swell, lies 1,900 yards southward from the southern point of McNutt Island, there being 4 fathoms water over rocky bottom in the channel between. Jig Rock is the only off-lying danger to be avoided when approaching McNutt Island from the southward.

Bell buoy.—A black bell buoy, marked "Jig Rock" in white, and surmounted by a bell, is moored, in 9 fathoms, 500 yards, 116° 30′ from Jig Rock.

Bell Rock, a few feet above high water and always visible, lies 2.3 miles 56° from Cape Roseway Lighthouse.

Straptub Rock lies on the southern end of a shallow spit, extending about 700 yards from Bony Point on the main shore. The rock uncovers at low water. Bell Rock lies about 1 mile 141° from Bony Point.

Surf Point has a remarkable bowlder on it.

Middle Rock, with 2¼ fathoms on its shoalest part and 3½ to 4 fathoms around, lies 1,200 yards from Surf Point and ½ mile from the nearest shore southeastward of Sand Point.

Buoy.—A red can buoy marks the southwestern edge of Middle Rock. It is situated about 1 mile 151° from Sand Point Lighthouse.

Sand Spit Light, fixed red, elevated 47 feet above high water, visible 10 miles, is exhibited from a white square wooden lighthouse, 44 feet in height on a concrete base 17 feet high, erected 80 yards from the extremity of Sand Point Spit.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

Buoy.—The shoal extending from Sand Point is marked on its outer edge by a red can buoy.

Adamant Shoal, about 1½ miles northward of Sand Spit Lighthouse, is 1.3 miles in extent, within the 5-fathom curve and lies nearly in the middle of and parallel in direction to Shelburne Harbor; the actual dangers are three rocky patches named Adamant Rock, with 1⅔ fathoms water over it; Man-of-war Rock, 300 yards to the westward, covered by ¾ fathom; and a 3-fathom rocky head 200 yards southwestward of the last named.

Clearing mark.—Red Bank, on the eastern coast of McNutt Island, in range with Sand Point, clears Man-of-war Rock 149° westward.

Buoys.—Seal Rocks lies about 1,200 yards northward of Nicholson Island; it is marked on its southwestern side by a red spar buoy.

A black spar buoy is moored on the southeastern side of Adamant Rock. Man-of-war Rock is marked by a spar buoy moored on the western side. The 1¼-fathom spot on the western side of the channel at the entrance of Birchtown Bay and ½ mile 305° from Man-of-war Rock is marked by a black spar buoy.

Hart Point Rock, with only 1½ fathoms water, lies about 400 yards to the southward of Hart Point, which divides the head of Shelburne Inlet into two branches.

A black spar buoy is moored off the southeastern edge of Hart Point Rock.

Soldiers Ledge—Buoy.—A 3-fathom patch about 2 miles 334° from Sand Spit Lighthouse is marked on the eastern side by a black spar buoy.

Hero Shoal, 1½ miles northeastward of Hart Point, with 2¼ fathoms water on it, lies toward the western shore near the head of the harbor, but it is farther in than vessels of large draft usually anchor.

Clearing mark.—Shelburne Episcopal Church in range 21° with the white house northeastward of the town leads 200 yards eastward of the shoal.

Shoal.—There is a shoal with 4¼ fathoms over it lying in the middle of the harbor 1,600 yards northeastward of Hart Point. This shoal should be avoided by bearings of the Episcopal Church tower.

Jordan River, a deep indentation with a general trend to the northward, is 1½ miles in breadth at its entrance. The place is easy of access and comparatively free from danger, but can not be deemed a good anchorage in consequence of the heavy seas which run in during southerly gales.

Blue Gull Island, about ¼ mile long and 45 feet high, forms the western point of entrance to Jordan River. Between this island and Jordan Point, a distance of nearly 1¾ miles, there are numerous rocks, some of which uncover at low water.

Breakwater.—On the eastern side of the entrance to Jordan River is a breakwater 30 feet broad which extends for a distance of about 500 feet in a 225° 30′ direction.

Jordan Light, fixed red, elevated 24 feet above high water, visible 6 miles, is exhibited from a white square wooden structure, 27 feet in height, situated on the end of the breakwater.

Green Island, which is common to Green Harbor and Jordan River is 70 feet high and ½ mile long and about the same distance from Patterson Point, the channel between carrying a depth of 15 feet.

The Sisters are a cluster of rocks about 700 yards from the western shore at distance of 1¾ miles within Jordan Point. Two of the rocks uncover at half ebb and generally show a break with much sea. About 200 yards eastward of the southernmost of the two rocks there is a shoal with only 1 fathom, beyond which there is deep water. Between The Sisters and the western shore there are several rocks which uncover at low water.

Directions.—Approaching Jordan River from seaward, steer to a pass between Bull Rock Bell Buoy and Shelburne Fairway Light and Whistle Buoy by bearings of Green Island, and after passing that island at a convenient distance steer up in mid-channel, between the Sisters Rocks and the eastern shore, and anchor in about 3½ fathoms 800 yards off the western shore, about 1 mile southwestward of Jordan Lighthouse, and Jordan Point in range 172° with the western side of Blue Gull Island.

Green Harbor is an indentation next westward of Lockeport Harbor, in which none but the smallest description of vessels can find shelter from southerly and southeasterly gales, which send in a heavy rolling sea. The entrance is clear of all dangers, and the harbor is easily navigable by the chart. Shelter can be obtained with westerly, northerly, and easterly winds.

Light and whistle buoy.—A red cylindrical buoy (known as Lockeport Light and Whistle Buoy), marked "L" in white, surmounted by a pyramidal frame supporting a whistle and lantern, from which an occulting red light is exhibited, is moored 3¾ miles 125° from Gull Rock Light.

Lockeport Harbor.—This place, formerly known as Rugged or Ragged Island Harbor, is seldom resorted to except by fishermen, although within the harbor the anchorage is good. There are numerous ledges and sunken dangers, rendering the approaches to the harbor difficult and dangerous. During southerly gales the uneven rocky ground at the entrance causes the sea to break from side to side.

There is a telegraph station at Lockeport Harbor.

Bull Rock, the outer of two dangers off Western Head, is covered by only 1½ fathoms water, and its position is generally marked by a breaker; from it the western extremity of Western Head bears about 1.3 miles 9°.

Within Bull Rock, ¼ mile, is another detached shoal having 1¼ fathoms, with deep water between and around the two. The highest part of Chain Ledges in range with the eastern end of Western Head, bearing 39°, leads westward of Bull Rock and the shoal, and Gull

Rock Lighthouse in range with the highest part of Ram Island, 61°, leads northward of them.

A black bell buoy with "Bull Rock" in white letters is moored in 15 fathoms, about ½ mile 187° from Bull Rock.

Long Shoal, covered with 3½ fathoms water, lies with the highest part of Green Island in range with the outer end of Western Head bearing 309°, and Gull Rock Lighthouse nearly 1 mile 29°.

South Ledge is a small detached shoal with 3 fathoms over it; from it Gull Rock Lighthouse bears 337°, the nearest point of the rock being ½ mile distant, and the highest part of Blue Gull Island (on the western side of Jordan River) in range with the outer end of Western Head, bearing 285°.

Gull Rock.—Gull Rock is a small rocky ledge, about 15 feet high, off the entrance to Lockeport Harbor.

Gull Rock Light, group occulting white, elevated 56 feet above high water, visible 10 miles, is exhibited from a white square tower, 31 feet high, on Gull Rock.

Fog signal.—A compressed-air diaphone is sounded.

Bell buoy.—A fairway bell buoy, painted in red and black horizontal bands, marked "Lockeport Fy" in white, is moored in 12 fathoms, eastward of Kelp Shoal, 1.3 miles 77° from Gull Rock Lighthouse.

Rock.—A rock, with a depth of 1¾ fathoms over it, lies 1¼ miles 46° 30′ from Gull Rock Lighthouse.

Whale Rock is the highest part of an extensive rocky shoal northeastward of and almost joining Gull Rock. The shoal is nearly 1 mile in length, north by west and south by east, within the 5-fathom curve, but the most dangerous part is the southern, where, in addition to Whale Rock, which uncovers at low water and always shows a break, are several sunken dangers, the southernmost of which is Kelp Shoal, with only ½ fathom water.

From Whale Rock, which lies ½ mile 43° from Gull Rock Lighthouse, Cape Roseway Lighthouse is in range with the tangent of Western Head, bearing 252°.

Shoal.—A 4½-fathom shoal lies ½ mile 69° from Whale Rock. A shoal 30 yards in extent with a least depth of 11 feet lies within the 5-fathom curve, 1¼ miles 46° 30′ from Gull Rock Lighthouse.

Trinidad Rock, a small detached patch with 1¾ fathoms water, is near the northern end of the shoal of which Whale Rock is a part, and from it Gull Rock Lighthouse bears 184° 1,800 yards.

Three red buoys are moored near Trinidad Rock to mark isolated shoal spots, one on the southeastern edge of the rock, one on the eastern edge of the 3¼-fathom spot ½ mile eastward of the rock, and one on the southwestern edge of the 1¾-fathom spot 1 mile eastward of the rock.

Chain Ledges consist of a narrow, broken ridge of rocks nearly 1 mile long, north and south. The highest part of the ledges stands about 10 feet above high water, and on the southern extremity is a small rock which uncovers at low water and generally shows a break.

From this latter rock Gull Rock Lighthouse bears 158°, over ¾ mile, and the extremity of Western Head bears 229°.

The northern end of the ledges terminates in a rock with only ½ fathom water, at a distance of ¼ mile from the highest part of the ledge, and between it and the southern end of some rocky ledges, southward of Cranberry Island, is Sam Rock, detached, with 1¾ fathoms water, but although deep-water channels exist on either side of it they are too narrow to be available for navigation except by small coasting vessels.

Middle Ground is an extensive shallow spit studded with rocks, several of which uncover at low-water springs. The shoal extends from the western side of Gooseberry Island more than halfway across to Cranberry Island, on the western side of the entrance to Ragged Island Harbor.

Clearing mark.—A yellow house on the eastern shore of the harbor open westward of Shag Rock, bearing 19°, leads westward of Middle Ground.

Shag Rock.—From the Middle Ground to the northward a shoal of 3 fathoms, on the northeastern end of which is Shag Rock, extends from the eastern shore nearly across the harbor, leaving a channel only about 200 yards wide, with a depth of 3¼ fathoms, abreast of Carter Island, thus rendering the inner part of the harbor useless for vessels drawing more than 15 feet.

Light and bell buoy.—A red light and bell buoy exhibiting an occulting red light is moored 30 yards to the southward of a rock with a depth of 2¼ fathoms over it 720 yards 129° from the southern extremity of Cranberry Island.

Laurier Rock, a 2-fathom rock, lies off the southwestern extremity of Middle Ground Spit, 1 mile 170° from Carter Island Lighthouse.

Dredging has recently been completed at Lockeport,, resulting in an entrance channel 200 feet wide, a channel in front of the wharves, and a turning basin, all to a depth of 15 feet at low water.

The dredged channel and the turning basin are marked by nine wooden spar buoys.

Carter Island Light, fixed red, elevated 66 feet above high water, visible 8 miles, is exhibited from a white square wooden lighthouse, 29 feet in height, on Carter Island.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

Black Point Rock uncovers at low water and is the outer and highest point of a spit extending ½ mile 184° from Black Point.

The white house near Cummings Point in range with the western end of Gooseberry Island, bearing 334°, leads westward of Black Point Rock, and Black Rock, its apparent length open northward of Ram Island, leads between Black Point Rock and Blow Breaker.

Blow Breaker (Eastern Bull), a small rocky patch, with only ¾ fathom water, lies about 1½ miles 60° from Gull Rock Lighthouse; from it the northern end of Ram Island appears in range with the southern end of Black Rock, bearing 54°, and a white house near Cummings Point is in range with the western end of Gooseberry Island 334°.

A red buoy is moored near the southeastern edge of Blow Breaker and another one ½ mile northward of Blow Breaker and southeast of Black Point Rock.

Tides.—High water, full and change, in Lockeport Harbor, is at 7h. 59m.; springs rise 7½ feet, and neaps 6 feet.

The tidal current alongshore between Ram Island and Baccaro Point is governed by the Bay of Fundy tide, the flood setting to the westward and the ebb to the eastward. The velocity increases in proceeding westward from Ram Island, where it varies from ½ to 1 knot an hour.

Current.—There is also a current off this shore, and though the general trend is to the westward, its velocity and direction are greatly influenced by winds. After easterly gales the current increases its westerly set and it is retarded in proportion by westerly gales.

Directions—From the westward.—After passing Western Head at a moderate distance, bring it in range with Cape Roseway Lighthouse, bearing about 251°, and continue with these marks in range until Gull Rock Lighthouse bears 133°, when steer 9° for the western side of Clam Island, taking care to avoid the 2-fathom shoal to the southward of Middle Ground; the least water in this route should be 3 fathoms. Rounding Clam Island at a distance of about 200 yards, anchor in 2¾ fathoms mud with the western end of Clam Island bearing 184° where the holding ground is good and the anchorage safe.

There is also fair anchorage on the eastern side of the bay a little over ½ mile northward of Shag Rock, in 3½ to 4 fathoms. Care should be taken on passing Shag Rock to avoid a shoal with only 1 fathom water on it, about 200 yards to the northwest.

The anchorage within Lockes Island is only adapted for vessels of small draft, and can not be deemed secure, as the holding ground is bad.

From the eastward.—As the narrow passage inside Ram Island should not be attempted by strangers, no directions are necessary, but vessels from the eastward, with a leading wind, can pass between Emulous and Farm Ledges, in a depth of 5 fathoms, by bringing Gull Rock Lighthouse in range with the outer end of Western Head bearing 264°; or outside Farm Ledge by bringing Government Point, at the entrance of Shelburne Harbor, in range with the outer end of Western Head, bearing 273°.

With either of the above marks in range proceed to the westward, until the white house near Cummings Point is in range with the western end of Gooseberry Island, bearing 334°, thence steer for the southern end of Cranberry Island, and when the yellow house is in range with Shag Rock, bearing 19°, steer about 9° for the western side of Clam Island, and proceed as before directed.

From seaward.—Bring Gull Rock Lighthouse to bear 4° and on approaching it pass about ¼ mile westward of the rock, and when abreast the lighthouse steer between Chain Ledges and Trinidad Rock. When approaching Cranberry Island bring the yellow house in range with Shag Rock, and proceed as before directed.

Or from the light and whistle buoy a 321° course will lead by the bell buoy and nearly midway between Blow Breaker and the 4½-fathom spot southwest of it; eastward of Trinidad Rock, Chain Ledges and Sam Rock, and thence to the southern end of Cranberry Island.

Ram Island, nearly ½ mile long and 21 feet high, lies off the pitch of Hemeon Head, from which it is distant ½ mile, but the channel, with a depth of 3½ fathoms, is narrowed to a breadth of 300 yards by shoal spits extending from the island and main shore. A dangerous rocky shoal extends, in a southwesterly direction, from the southern end of Ram Island for a distance of 1 mile, terminating in Emulous Ledge, which uncovers at low water.

Farm Ledge is a small detached shoal, with 3¾ fathoms water, ½ mile southward of Emulous Ledge, the channel between having depths of 5 to 7 fathoms.

From the ledge the western tangent of Black Rock and eastern tangent of Ram Island appear nearly in range, bearing 16°, and the extremity of Western Head just shut in by Gull Rock bearing 267°. There is also a small 5-fathom spot ½ mile 189° from Farm Ledge.

Black Rock, about 10 feet above high water, at a little distance resembles two rocks; it is about ¼ mile from the shore of Hemeon Head, with a narrow, deep-water channel between.

Bantam Rock, of small extent, lies about 1,750 yards 198° from Harding Point, and uncovers at low water; it is the highest point of a cluster of rocky patches which occupy a space 1,750 yards in length, north-northeast and south-southwest. From Bastard Rock, the southeasternmost of the group, covered with 3¼ fathoms, the summit of the dark hill of Richardson Head is seen over the high-water tangent within Green Island, bearing 23°. The southwestern of these rocks, over which there is a depth of 4¼ fathoms, lies ¼ mile 217° from Bastard Rock.

Although there is a deep-water channel between Bantam Rock and the entrance points of Sable River, large vessels should keep outside these patches.

Bell buoy.—A black bell buoy, marked "Bantam" in white, is moored in 10 fathoms, 400 yards south-southeastward from Bantam Rock.

Sable River.—The entrance to Sable River is between Raspberry Head, on the west, and Harding Point, about 1.4 miles to the eastward. As a bar with only ½ fathom water extends across the river entrance about 1½ miles within Raspberry Head, none but very small vessels in charge of men possessing local knowledge can navigate the river.

Harding Point, at the eastern entrance of Sable River, is 1¾ miles west-southwestward of Green Island.

Green Island, about 200 yards in extent and 45 feet in height, lies 2½ miles southwestward from Thrum Point, and about ½ mile from the nearest shore, the passage between being rocky, shallow, and uneven. A small rock awash at low water lies on the outer end of a spit, extending 600 yards southwestward from the island.

Port Hebert is a narrow indentation 5¾ miles long in a northerly direction; Thrum Point, on the eastern side of the entrance to Port Hebert, is situated 5¼ miles 256° from Little Hope Lighthouse. The entrance to the port may be easily recognized by the dark hill of Richardson Head, thickly wooded and about 130 feet high, with a very abrupt fall toward the eastward. Within Richardson Head, and stretching across the river, is a bar with 2 fathoms water, which breaks in heavy weather. Higher up on the eastern shore, at a distance of 1 mile from Richardson Head, is a remarkable shingle spit which projects at right angles from the shore, and close around this spit is the channel, which is very narrow.

Rock.—On the western side of the channel opposite Shingle Spit, about 200 yards, is a small rock which uncovers at low water; this rock is the northern termination of foul and shallow ground extending from a little within Richardson Head.

A black wooden spar buoy is moored in 2½ fathoms water to mark a ledge opposite Shingle Point.

Shingle Point Light, fixed red, elevated 33 feet above high water, visible 10 miles, is exhibited from a white square lighthouse, 29 feet in height, situated on Shingle Point, eastern side of Port Hebert.

Hebert Rocks, which uncover at low water about ¼ mile from the shore, form the outer part of a spit extending from the western point of entrance to Port Hebert.

Clearing marks.—Shingle Point Lighthouse in range with Richardson Head bearing 1° leads about 200 yards eastward of these rocks.

White house in range with Shingle Point Lighthouse, bearing 344°, clears the shoal water off Thrum Point by 200 yards.

Tides.—High water interval at Port Hebert is 7h. 46m.; mean range 6.4 feet, spring range 7.8.

Directions.—Port Hebert affords safe anchorage, but only to small vessels, on account of the bar and the narrow channel. Strangers should never attempt the port without a leading wind, and even then the services of a pilot should be procured.

Vessels from the eastward approaching Black Point should keep Southern Point of Mouton Island well open of Mouton Head, bearing 26°, in order to clear the Black Point dangers. Thrum Point should be kept well open northward of Lesser Hope Rock (10 feet high), to pass inside Little Hope Shoal; and on nearing Thrum Point do not bring the center of Little Hope Islet to bear southward of 71° until Shingle Point is in range with a white house about ¾ mile within it, bearing 344°.

Anchorage.—Proceed with these marks in range, and when approaching Shingle Point pass it about 100 yards off, and anchor in 3½ fathoms off a watercourse on the southern end of a shingle beach, northward of Shingle Point, the latter bearing 144° 600 yards.

Port Joli, an indentation 5 miles deep, is only available for small vessels, and even for those there is no safe anchorage; the so-called port should be avoided by strangers.

Little Hope Shoal, 2 miles 245° from the center of Little Hope Islet, is about 700 yards long within the 5-fathom curve, and has on its shoalest point a depth of 1¾ fathoms only, from which Lesser Hope Rock, off the western point of Port Joli, is in range with Thrum Point on the eastern side of Port Hebert, bearing 264°, and the eastern tangent of Joli Point, bearing 354°; the distance off the pitch of the point being about 1¼ miles.

Bell buoy.—A red bell buoy, with "Little Hope Shoal" in white letters, is moored in 14 fathoms ½ mile 180°, from the middle of the shoal.

Little Hope Islet, 15 feet high, situated nearly 2 miles 91° from Joli Point, is composed of small bowlders, thrown up by the sea, on a rocky foundation, and from it, in a northerly direction, shoal water extends about 700 yards, while on the southern side the 5-fathom curve is about 700 yards from the shore of the islet.

Little Hope Islet Light, group flashing white, elevated 100 feet above high water, visible 15 miles, is exhibited from a cylindrical tower, 98 feet high, surmounted by a red lantern.

Fog signal.—A hand foghorn is sounded at the lighthouse in answer to vessels.

Light and whistle buoy.—A red cylindrical buoy, marked "Little Hope" in white and surmounted by a pyramidal frame supporting a whistle and lantern, from which an occulting red light is exhibited, is moored in 20 fathoms about 1.3 miles 161° from Little Hope Islet Lighthouse.

Coast.—Between Joli Point and Mouton Head, a distance of about 3¾ miles, are Cadden and Little Joli Bays, which are separated from each other by Black Point, off which shoal water extends for about 800 yards.

Bell buoy.—A bell buoy, painted black and white in vertical stripes, is moored in 11 fathoms ¾ mile 97° from the southern extremity of Mouton Head.

Port Mouton is a large and moderately deep indentation between Mouton Head on the south and White Point on the north. On the southwestern side of the port are Mouton Island and several smaller islands, which from their position afford a safe and commodious anchorage for vessels of large draft.

There are two channels leading to the anchorage; the one northward of Mouton Island is available for large vessels, but the western channel is narrow and difficult and not adapted for vessels drawing more than 15 feet of water. The principal occupation of the settlers along the shores of the port is fishing.

The Port is at the entrance to Jones Creek, between Bell Point and Charles Island.

Channel.—A channel, 100 feet wide and 10 feet deep at low-water spring tide, has been dredged from a point off Bell Point to the public wharf. The channel extends 2,100 feet 270° from its eastern end and then curves on a radius of 650 feet to the northward for a distance of 400 feet to the basin, 250 by 300 feet, outside the public wharf and Neville Wharf. The wharves extend out 300 feet from the shore.

Buoys.—The channel is marked by seven spar buoys, three red and four black.

The outer red buoy is moored at the eastern end of the channel 250 yards 201° from Bell Point. The second red buoy is moored 800 feet and the third 1,550 feet from the first.

A black spar buoy is moored opposite each of the red ones, and the inner black buoy is moored on the southern side of the basin 200 feet from the outer end of Neville Wharf.

Mouton Island—Spectacle Ledge.—Mouton Island, 110 feet high, is 2 miles long north and south and 1,300 yards broad. From its northern point a spit extends 1,800 yards north-northwestward, terminating in Spectacle Ledge with 2¾ fathoms on it; between this patch and a similar depth near the island there is a depth over the spit of 3¼ fathoms.

There is a detached shoal of 3¾ fathoms about 900 yards north-northeastward from Spectacle Island Lighthouse.

Clearing mark.—The white sand cliffs on the southwestern side of the harbor open northward of Spectacle Island bearing 211°, lead westward of Spectacle Ledge and the shoal off it.

A black spar buoy is moored on the northern side of Spectacle Island Shoal.

Lifeboat.—There is a lifeboat station at the northwestern end of Mouten Island.

South Rock lies 400 yards off the southern point of Mouton Island; it uncovers at low water and may be cleared on its western side by keeping the eastern end of Jacket Island apparently in range with the southwestern tangent of Mouton Island.

Bull Rock, 4 feet above high water, lies 300 yards off Bull Point on the mainland within Mouton Island, and from its position is useful as a guide for the narrows.

There is a rock off Newhouse Cove on which there is 1¼ fathoms.

Bull Rock, in range 335° with the eastern end of Spectacle Island, will lead eastward of this rock.

There is also a rock with ½ fathom water, which is steep-to on its eastern side, 300 yards northward from Bull Rock.

Anchorage.—The anchorage is in 6 to 7 fathoms, mud, between Spectacle Island and Mink Island, 1,600 yards northwestward of it.

Middle Rock, with about 1¼ fathoms water, occupies a central position in the narrows of the western channel between Bull Rock and the rocks extending in a south-southwesterly direction from Jacket Island and limits the navigable channel on either side to little more than 200 yards.

Jacket Island, westward of Mouton Island, is steep-to on its northwestern side, but to the southward the low water mark runs off about 300 yards in broken rocks; between Jacket and Mouton Islands the ground is foul.

Spectacle Island occupies a space ½ mile in length, and is moderately steep-to on its northern and northwestern sides. Between the island and the main shore are numerous rocks, and it is also connected by a shallow rocky spit with Massacre Island, the spit extending altogether 1,200 yards to the southeastward of Spectacle Island.

Port Mouton Light, fixed white, elevated 47 feet above high water, visible 11 miles, is exhibited from a white square wooden building, 20 feet in height, with a red lantern, on the northeastern point of Spectacle Island.

Fog signal.—A hand foghorn is sounded in answer to vessels.

Spectacle Rock, being 3 feet above high water, can always be seen; it lies 266 yards from the northeastern point of Spectacle Island, with a deep channel between.

Devastation Shoal is about 700 yards in length, northwesterly and southeasterly direction, with only 2 fathoms water on its northern end, which lies in an easterly direction ¾ mile from the southern point of Mouton Island. There is a deep-water channel between the island and the shoal; Round Rock, bearing 4°, will lead through the center in a depth of 5 fathoms.

Brazil Rocks form a cluster about ¼ mile in length; several of the rocks uncover, but one known as Round Rock is always above water, and is consequently of great service in entering the port by the eastern channel.

A detached rock, with only ½ fathom water, and shoal water around it, lies 800 yards southeastward from Round Rock.

Round Rock is about 1 mile 62° from Halibut Head.

White Point Rock, covered with 2¾ fathoms, is of small extent, with deep water close-to; from it White Point bears 327° 1¼ miles, and the highest Brazil Rock in range with Halibut Head bears 242°.

White Point Shoal.—Outside White Point Rock, at a distance of 1,750 yards, and slightly to the northward of the range of bearing last mentioned, is White Point Shoal, with a depth of 6 fathoms and 10 to 13 fathoms close around. This shoal should be avoided by large vessels.

Halibut Head well open either way of Round Rock clears the above shoal and rock.

Eastern Channel lies between the Brazil Rocks and Mouton Island, the channel between being deep and free from danger.

Tides.—High water interval at Port Mouton is 7h. 49m.; spring range 7½ feet and mean range 6.1 feet.

Directions—Western Channel.—When between Mouton Head and South Point, Mouton Island, bring Bull Rock in range with the eastern tangent of Spectacle Island, bearing 335°, and continue with these marks in range until approaching the rock, which should be past on its eastern side about 150 yards, with the vessel's head toward Spectacle Rock. This course should be continued until the southern end of Jacket Island bears 88°, when by steering 268°, anchorage in 7 fathoms, mud, may be obtained northward of Bull Point, with Bull Rock open a little southward of the South Point, Mouton Island, and Spectacle Rock just open westward of Massacre Island; at this anchorage the holding ground is good, but a disagreeable swell is experienced during easterly gales.

Should the vessel be bound to the safer anchorage westward of Spectacle Island, then, after passing the dangers of the Western Channel narrows, a course should be steered to pass around the northern end of Spectacle Island, after which the directions for the Eastern Channel should be followed.

There is a passage westward of Bull Rock, and also one eastward of the sunken Middle Rock, but neither of these passages should be attempted by strangers and they are less direct than the one recommended.

Eastern Channel.—If from the eastward, give White Point a berth of about ½ mile, and proceed to the westward, taking care to avoid shutting in East Point, Mouton Island, with Halibut Head until the white sand cliffs, southward of the anchorage, open out westward of Spectacle Island, bearing 211°, in order to clear Spectacle Island Shoal and the adjoining detached shoal.

With the above marks in range steer in about 217°, and anchor in 6 or 7 fathoms, mud, with White Point just shut in by the northern end of Spectacle Island and Massacre Island in range with the southern end of Spectacle Island.

Coming from seaward, and wishing to pass between Mouton Island and Brazil Rocks, bring Halibut Head in range with the northern tangent of Spectacle Island, bearing 276°, and proceed with these marks in range until Round Rock bears 4°, when alter course to 299°, taking care not to shut in the eastern point of Mouton Island with Halibut Head until the white sand cliffs, before alluded to, open out westward of Spectacle Island, when proceed as previously directed to the anchorage.

Coast.—Western Head is 3¾ miles northeastward of White Point, the coast between falling back and forming Gull Bay, eastward of Black Point. Gull Island is in the western end of the bay. At Western Head the coast changes its direction and trends northward about 2 miles to Moose Point. In this stretch are Strawberry Point, Scotts Bay, and the Sow and Pigs Islands.

Liverpool Bay extends about 2½ miles in a northwesterly direction, and has a width at the entrance of 1¼ miles between Moose Point, and Eastern Head.

The bay is dangerous, especially during the fall and winter months, for all vessels except those of a sufficiently small draft to anchor in Herring Cove. From Eastern Head to the westward for the distance of 1 mile the shore is foul, and an offing of ½ mile should be maintained.

Liverpool.—The town of Liverpool, at the head of the bay, is hidden from view on approaching from seaward. It carried on, in connection with Milltown, an extensive trade with Halifax, the

United States, and West Indies. The exports are principally lumber, cord wood, fish, and farm produce. The population is about 2,300.

Shipbuilding is carried on to a small extent, and a considerable amount of tonnage belongs to the port; there is a foundry where small repairs can be effected. Provisions and water can always be procured.

The United States is represented by a consular agent.

Wharves.—There are 15 wharves connected with the railroad system, with an area of 168,000 square feet, including the space occupied by buildings on the wharves. There is also a large coal wharf where coal can be loaded or bunkered. The Liverpool and Milton Railway Co. have extended their line along the water front and cars are taken to the vessels' side with lumber and general cargo. Pulp wood is largely shipped from this place and steamers usually load 2,000 or 3,000 tons and finish balance of cargo in Halifax.

Supplies.—Stores, provisions, and water are readily procured. Stevedores and a large tug can be obtained.

Patent slip.—The Liverpool Marine Railway is operated by electricity and vessels of moderate size can be repaired.

Communication.—Steamers en route from St. John to Halifax call. It is connected by telegraph and railroad with the Canadian system.

Storm signals are hoisted at Liverpool.

Light and whistle buoy.—A light and whistle buoy, painted black and white in vertical stripes, marked "Liverpool," surmounted by a steel pyramidal frame carrying whistle and lantern, from which an occulting white light is exhibited, is moored in 21 fathoms water, in the fairway to Liverpool Bay, 1¾ miles 165° from Coffin Island Lighthouse.

Light and bell buoy.—A cylindrical buoy, painted in black and white vertical stripes, surmounted by a steel frame supporting a bell and lantern, from which an occulting white light is moored 400 yards 55° from Fort Point Lighthouse, leads to the channel across the bar.

Fort Point Ledge extends off Fort Point in a northeasterly direction, the outer point of the ledge being 200 yards distant from the lighthouse.

Buoys.—Fort Point Ledge is marked on its northeastern end by a black buoy moored in 2 fathoms. The submerged extremity of Brooklyn Pier on the eastern side of Herring Cove is marked by a red conical buoy.

Fort Point Light, fixed red, elevated 30 feet above high water, visible 7 miles, is exhibited from a white square tower 17 feet high on Fort Point.

Fog signal.—A hand foghorn is sounded in answer to vessels.

Barrel Rock Bar Light, fixed white, 20 feet above high water, visible 6 miles, is exhibited from a dolphin on the southwestern end of Barrel Rock Bar, 660 feet 274° 45′ from the lighthouse on Fort Point.

A fixed red electric light is shown from the middle of the bridge 867 yards 235° from Barrel Rock Bar Light. The light is exhibited 28 feet above high water from the superstructure of the bridge and visible 1 mile. Barrel Rock Bar Light, in range with this light, leads in through the dredged cut over the bar at Fort Point in about 14 feet of water.

The anchorage is in from 4 to 6 fathoms, mud.

Dredged channel.—Approaching the inner harbor is a bar which has been dredged, allowing vessels drawing 18 to 20 feet of water to enter and load at the wharves.

Brooklyn Pier Light, fixed green, elevated 30 feet above high water, visible 4 miles, is exhibited from a mast 25 feet high, with a white square shed at its base near the root of the pier off the southern point of Herring Cove.

Tides.—High water interval in Liverpool Bay is 7h. 35m.; mean range 6½ feet, spring range 8 feet.

Directions.—In proceeding to Liverpool Bay make the fairway light and whistle buoy, and from it steer 302°, keeping about a mid-channel course, care being taken to avoid the 3½-fathom patch off Black Point, by keeping Liverpool Lighthouse well open of the high-water line on the southwest side of the bay, and the 2¾-fathom patch 1,400 yards westward of Eastern Head.

Anchorage.—The anchorage mark in Herring Cove is Moose Point in range with the southeastern point of the cove, in about 2 fathoms, mud; the holding ground is good, but a considerable sea rolls in during heavy gales between south and east.

Safe anchorage can be obtained at the entrance of the river abreast the town, but it is only adapted for small vessels, as a bar with 4 feet water extends across the entrance; the services of a local pilot are necessary.

Coffin Island, about 1,200 yards in length and thickly wooded, lies on the northern side, and is the eastern entrance point of Liverpool Bay. The northern end of the island is 1,200 yards from the mainland, and is connected with it by a shallow bar, on which in some places the depth is ½ fathom. Shoal water extends to the distance of 400 yards from the eastern and western shores of Coffin Island; off the southern point the 5-fathom curve is 800 yards.

Coffin Island Light, flashing white, elevated 60 feet above high water, visible 13 miles, is exhibited from an octagonal reinforced concrete tower, 54 feet in height, octagonal iron lantern with red roof, erected on the southern point of Coffin Island.

A rectangular white wooden dwelling stands 125 feet 348° from tower.

Coast—Port Medway Harbor.—The western entrance point to this harbor, Medway Head, is about 6 miles northeastward of Coffin Island, the coast between being indented by Eagle Bay, Blueberry Bay, and Rugged Harbor, none of which are of sufficient importance to require a detailed description.

The entrance channel to the port has a general north by west trend for 2 miles, whence it opens out into a large, shallow, and irregular basin, studded with numerous rocks and shoals.

The eastern side of the entrance consists of a series of small islands extending from the mainland about 3 miles in a southerly direction, terminating in Frying Pan Island, a small rocky islet 10 feet high.

In Medway Harbor there is anchorage in 3¾ fathoms, but in the channel leading thereto are several rocks, and strangers should procure the services of a local pilot. The harbor is protected by a breakwater. Lumber and fish form the principal exports.

Above the town to the northwestward are several sawmills.

Medway Head, a dark wooded headland, forms the western point of entrance into Port Medway.

Medway Head Light, fixed white, 44 feet above high water, visible 10 miles, is exhibited from a square building 23 feet in height, resembling a dwelling house, painted white, with black squares to seaward.

Bell buoy.—A bell buoy, painted black and white in vertical stripes and marked "Port Medway," is moored in about 14 fathoms 1.7 miles 183° from Southwest Breaker, with Medway Head Lighthouse bearing 346° 2.8 miles.

Southwest Breaker, a dangerous patch covered with only 1 fathom, lies on the southern end of a rocky shoal off the entrance of Medway Harbor. Between it and Frying Pan Island, which bears 352° 1,750 yards, there is a 6-fathom channel about 800 yards wide.

Whistle buoy.—A red whistle buoy, marked "S. W. Breaker" in white letters on the side, is moored in 15 fathoms of water ¼ mile southwestward of Southwest Breaker, entrance to Port Medway.

Stone Horse Rock is a detached rock which uncovers at low-water springs, and from it Medway Lighthouse, bearing 283°, appears almost in range with the southern tangent of Frying Pan Island; from the latter the rock is about 700 yards distant.

Rugged Rock, a detached patch lying off the extremity of a spit extending from the shore a little southward of Medway Head, is covered by about 1¼ fathoms water and is marked by a breaker in heavy weather; from it Medway Lighthouse bears about 1,400 yards 3°, and Frying Pan Island 51°.

A remarkable granite bowlder on the shore northward of Medway Lighthouse, seen clear to the eastward of that building and in range with Neils Point, bearing 345°, clears the rock on its eastern side.

Stony Ridge, consisting of bowlders, with 1½ fathoms water over its shoalest part, is distant about 200 yards from the nearest high-water line northward of Medway Lighthouse; from it the granite bowlder already alluded to shuts in the tangent of Medway Head.

Middle Island Rock, with 1½ fathoms of water, is marked by breakers in heavy weather; this rock lies on the eastern side of the channel abreast Neils Point, about 800 yards northwestward from the western end of Middle Island.

Middle Ledge, a shoal patch about 700 yards in length, 11° and 191°, has on it several rocks which uncover at low water; the highest of these rocks shows soon after half ebb, and during heavy weather is always marked by a break.

Dry Ledge is about 800 yards northwestward from a rock on the southern end of Middle Ledge, which uncovers at low water.

Nautilus Rock, covered by 1½ fathoms water, lies 600 yards southwestward of Dry Ledge.

Clearing marks.—Medway Head Lighthouse, bearing 169°, open of Neils Point, leads eastward of Nautilus Rock; and the southern end of Bass Island in range 261° with the breakwater lighthouse leads northward.

Shoal Flat.—Nautilus Rock is on the outer end of a large flat, extending 1,400 yards from the shore, between Neils Point and the town. The flat is connected by a narrow neck with the shoal water of the northern part of the bay.

Range marks.—The southern end of Bass Island apparently in range with the point by the lighthouse bearing 261° leads over the neck in about 2½ fathoms; and the northern end of Bass Island apparently in range with the southern end of Foster Islands bearing 258°, just clears the southern edge of the bank extending in an easterly direction from Foster Islands.

Buoy.—A black can buoy is moored 1,100 yards 11° from Neils Point, at the northeastern corner of the flat.

Medway Breakwater Light, fixed red, elevated 31 feet above high water, visible 6 miles, is exhibited from a square white wooden tower on the eastern end of the breakwater at Port Medway.

The light is not visible southward of the buoy off Neils Point.

Tides.—High water interval at Port Medway is 7h. 30m.; spring range 8 feet, mean range 6.4 feet.

Directions.—Vessels from the westward should not bring Coffin Island Lighthouse to bear to the southward of 270° until Medway Head Lighthouse bears 3°, in order to clear the shoal water off Pudding Pan Island. The course may then be altered to bring the lighthouse to bear 347°, when steer to pass midway between it and Toby Island. After passing the latter bring Dry Ledge to bear 338° and steer for it or bring Frying Pan Island to bear 153° and steer 333°, taking care to keep Medway Head Lighthouse in sight to the eastward of Neils Point, in order to clear the shoal extending northward from Neils Point.

When Neils Point bears 274°, if the buoy on the extremity of the flat can be seen a 352° course should lead to the eastward of it and in deeper water.

When the breakwater lighthouse bears 274° bring Dry Ledge to bear 341° in order to keep well clear of Middle Ledge, and when Bass Island opens out northward of the lighthouse, bearing 262°, alter course to bring Bass Island in the middle of the opening between the lighthouse and the southern extremity of Foster Islands. Continue with this mark in range, and when the northern end of Toby Island is in range with Neils Point, bearing 238°, anchor in 5 fathoms, mud.

If from the southward, pass the bell buoy at the entrance on either side, and the whistling buoy, marking Southwest Breaker, to the westward, and steer midway between Medway Head Lighthouse and Frying Pan Island by bearings of the lighthouse; after passing the lighthouse proceed as before directed to the anchorage.

If from the eastward, and wishing to pass between Stone Horse Rock and Southwest Breaker, open Medway Head Lighthouse to the southward of Frying Pan Island, and when the lighthouse bears 299° steer for it until past Frying Pan Island, which is steep-to on its western side. Then steer in mid-channel between the lighthouse and Toby Island and proceed as before directed.

Green Bay, the next large bay northeastward of Medway Harbor, extends about 3½ miles to the northward, with soundings decreasing very gradually over a sandy bottom. As the bay is open to the southward and southwestward, it is not a safe anchorage with winds from those quarters. It is also objectionable during easterly gales, which generally draw round by way of south.

Crooked Channel—Anchorage.—Small vessels will find secure anchorage within the entrance of Crooked Channel, to enter which bring the wharf (not shown on the chart) on Johnson Island in the middle of the opening, bearing 53°, and steer on this course in the center of the channel. After passing the rocky entrance keep between the mud banks on either side, which may be distinguished by the grass which grows on the mud flats, and anchor when about 200 yards distant from the wharf.

Buoys.—Crooked Channel, leading to the anchorage from Green Bay, is marked by a red spar buoy on the starboard hand. Leading to the anchorage from False Lahave the channel is marked by a red spar buoy on the starboard hand and three black spar buoys on the port hand.

Green Point Rock, a small isolated patch, having about 1¾ fathoms water on it, lies 700 yards 289° from Green Point.

Green Ledge, ¼ mile in extent, has a small portion which uncovers at the last quarter ebb; from this part Long Point, on the western side of Green Bay, bears 340°, 1,750 yards. Entering Green Bay eastward of Halfway Rock and Green Ledge, on passing Indian Island, the southwestern end of Indian Island should not be brought to bear eastward of 154° to avoid Halfway Rock and Green Ledge, or westward of 166°, in order to clear Green Point Rock.

Bell buoy.—A black bell buoy, marked "Green Ledge" in white is moored in 7 fathoms of water 250 yards 138° from the rock which uncovers at low water on Green Ledge.

Halfway Rock, nearly midway between Indian Island and Long Point, has 2¾ fathoms water on it, and lies with Cape Lahave a little open southward of Green Point, the latter bearing 82°, 1¼ miles.

Green Point forms the eastern point of the bay of the same name.

Indian Island, about ½ mile long, is 1 mile southward of Green Point, with a clear, deep channel between ¾ mile wide. Both shores of this channel may be safely approached to the distance of 400 yards.

Bantam Shoal, a small rocky patch with only ½ fathom water, lies nearly in range between Green Point and Cape Lahave, off the center of Bantam Bay, and from it Green Point bears 273° 1,750 yards.

Lahave River.—From Cape Lahave an abrupt cliff, with a reddish face, 95 feet high, forming the western point of the river entrance, to West Ironbound Island on the east, the distance is 4 miles in a northeasterly direction.

From its entrance the river takes a general trend to the northwestward and is navigable for small vessels as far as Bridgewater, a settlement on the right bank of the river, nearly 15 miles from West Ironbound Island.

The shores of Lahave River are well settled and several vessels are employed in the Labrador trade.

On the inside shore of Cape Lahave are numerous islets, which, by retaining the débris of the river, are now connected with each other and the main shore by a series of shallow banks, with occasional deep-water holes and channels.

The Lahave River, a tidal river, is buoyed from the mouth to Bridgewater and has a depth of water from 3 to 8 fathoms at the mouth at low water and 2 fathoms at Bridgewater. Tide rises 6 feet at ordinary tide. There is good anchorage from 4 to 6 fathoms in the harbor.

Bridgewater has a population of about 3,000.

The United States is represented by a consular agent.

Industries.—These consist chiefly of fish curing, woodworking and planing, and various factories, shipbuilding, and gold mining, with two crushing mills.

The exports are lumber, cordwood, staves, and bark.

Supplies.—Ship carpenters and materials and all kinds of stores and provisions are easily obtained.

Wharves.—There are several wharves in the harbor with 14 feet of water at the end where steamers call and deliver and receive freight. The wharf on the western side is about 250 yards along shore and is principally used for small vessels discharging coal and merchandise and loading lumber. This wharf will accommodate 10 schooners. Dawson Wharf is 700 feet along the water front and will accommodate three vessels. Davison Lumber Co.'s wharf is about 125 yards along shore and will accommodate seven vessels of 1,000 tons each. The railroad wharf, main wharf, affords room for two large vessels, and the quay for about three large vessels on each side. This wharf has a railroad siding.

Repairs.—There are no sheds on the wharves and no docks for repairing vessels, but they can be hauled out on the bank without trouble.

Communication.—There is communication by steamer with Halifax, and the town is connected by railroad and telegraph with the Dominion systems.

Black Rock, small in extent and 5 feet above high water, lies 1 mile 115° from Cape Lahave. Small vessels may approach tolerably near this rock on all sides, but large vessels should not approach its southern side nearer than ½ mile on account of two small shoals with 4½ and 4¾ fathoms water, respectively.

Clearing mark.—The southeast tangents of Point Enrage and West Ironbound Island in range bearing 29° leads southward and eastward of these shoals.

Light and whistle buoy.—A red cylindrical buoy, with "Lahave" painted in white letters on top, surmounted by a frame supporting a whistle and lantern, from which a red occulting light is moored in 22 fathoms 2¼ miles 183° from West Ironbound Island Light.

Cape Rock, situated ¼ mile from Cape Lahave in a southerly direction, is small, with 3¼ fathoms over it and deep water all around.

Channel.—Between this rock and Black Rock there is a deep-water channel, and a safe range mark through is Cross Island Lighthouse, in range with the southeastern tangent of West Ironbound Island, bearing 42° or, as Black Rock is always seen, it can be approached on its inner side much nearer than the line of the above bearing.

Mosher Island, 135 feet high, situated 1½ miles westward of West Ironbound Island, is 1½ miles long east and west and ½ mile broad. It is connected with the eastern Spectacle Island, ½ mile to the northward, by a bar with general depths of 2½ fathoms.

Mosher Island Light, fixed red, elevated 55 feet above high water, visible 8 miles, is exhibited from a lantern on the roof of a white square lighthouse, 26 feet in height, erected on the eastern extremity of Mosher Island, western side of the entrance of Lahave River.

Fog signal.—A hand foghorn is sounded in answer to vessels.

Ironbound Breaker, a small rock on the outer extremity of a spit extending ¼ mile from the southwestern point of West Ironbound Island, has only 4 feet water on it.

The eastern Spectacle Island, 108 feet high, lies ½ mile to the northward.

French Rock, with about 1¼ fathoms, and 2 to 3 fathoms close around, lies on the bar between the eastern Spectacle and Mosher islands. From French Rock the eastern end of the western Spectacle Island is in range with the western end of the eastern Spectacle Island, and the east tangent of the eastern Spectacle Island bears 7°. West Ironbound Island Lighthouse, just seen clear of the northeastern end of Mosher Island, leads southward of French Rock.

Mosher Ledge, lying nearly midway between the western end of Mosher Island and the western Spectacle Island, is covered by only 1 foot water. From it the Episcopal Church (a small brown building with a belfry) on the mainland abreast Oxners Head, is seen just open westward of the western Spectacle Island, bearing 333° and West Ironbound Island Lighthouse, just in range with the northeastern tangent of Mosher Island bearing 107°.

Cockawee Shoal, ½ mile long, lies northwestward of the western Spectacle Island, and has only ¾ fathom water on its shoalest part.

Clearing marks.—The southwestern end of West Ironbound Island, apparently in range with the northeastern end of the eastern Spectacle Island, bearing 121°, leads southwestward; Mosher Island Lighthouse open of the eastern Spectacle Island, bearing 146°, leads eastward; and the Episcopal Church, bearing 354°, leads westward of Cockawee Shoal.

Oxners Rock, which dries at low water, about 200 yards from the beach, is the highest part of a shoal extending off Oxners Head for some distance alongshore. At this part of the coast there is a depth of 2 fathoms at nearly ¼ mile from the high water mark.

Bell buoy.—A red bell buoy is moored in 3½ fathoms 1½ miles 334° 30′ from Mosher Island Light. This buoy marks the entrance to the shallow channel past Oxners Rock, as well as the turn into the deeper channel south and west of the entrance of Lahave River.

A red conical buoy is moored on the western side of Oxners Rock.

Currie Cove is about 2 miles west-northwestward of Mosher Island. The entrance to the channel leading to it is about 1 mile northwestward of the western Spectacle Island.

Buoys.—The eastern side of the channel is marked by black spar buoys and the western side by red spar buoys.

Fort Point Light, fixed red, elevated 48 feet above high water, visible 8 miles, is exhibited from a white square lighthouse, 35 feet in height, with dwelling attached, on Fort Point.

Fog signal is a hand foghorn.

Tides.—It is high water, full and change, at Mosher Island 7h. 51m.; springs rise 7 feet, neaps rise 5¾ feet. Getsons Cove (Fort Point), 7h. 55m.; springs rise 7¼ feet, neaps rise 6 feet. Bridgewater, 8h. 6m.; springs rise 8 feet, neaps rise 6 feet.

Bull Rock.—From the shore, near the Episcopal Church, there extends in a northeasterly direction a rocky shoal, the highest part of which, known as Bull Rock, is generally visible, though just awash at high water, extraordinary spring tides. About 200 yards from Bull Rock in a southeast direction there is a shoal with less than ¼ fathom water, and another covered with ½ fathom lies nearly 200 yards from Bull Rock in a northeasterly direction.

The Episcopal Church, bearing 273°, leads southward, and Krout Point in range with middle of Parkes Island bearing 5° leads eastward of the shoal.

Directions—Anchorages.—Approaching Lahave River two passages are available, one on each side of West Ironbound Island. The only danger to be avoided on passing westward of the island is Ironbound Breaker, which may be cleared on its western side by bringing Gaff Point to bear eastward of 0°.

The passage northward of West Ironbound Island, although more direct, is narrow; Shag Rock is nearly always seen, but should it be covered, the southeast tangent of Cross Island, in range with Point Enrage, bearing 47°, will clear Shag Rock and lead through between the island and Gaff Point. This passage is only adapted for small vessels.

There are several available anchorages at the entrance of, and within Lahave River. With westerly winds vessels may anchor in safety along the northern shore of Mosher Island, outside French Rock, which may be avoided by not shutting in Krout Point with the eastern point of the eastern Spectacle Island.

With easterly winds the anchorage inside French Rock is preferable; but this position is not attainable at low water by vessels drawing more than 14 feet.

Before the eastern end of the eastern Spectacle Island bears 351°, West Ironbound Lighthouse should be brought just open of the northeast end of Mosher Island, bearing 109° and continuing to the northwestward with these objects on, anchor in 3½ or 4 fathoms mud, with Fort Point and the eastern end of the western Spectacle Island in range, bearing 351°.

To pass northward of French Rock proceed with the southwest tangents of the two Spectacle Islands in range until the eastern end of the eastern island bears 14°, when steer 261° and anchor as before directed.

Vessels making for the anchorage northwest of the Spectacle Islands should pass ¼ mile from the northern shores of those islands and anchor in about 3½ fathoms mud, with Fort Point Lighthouse bearing 10° and the northern end of the western Spectacle Island being 121°.

The safest anchorage about Lahave is within the river entrance to the northwestward of Fort Point, the deepest channel to which is on the western side of Cockawee Shoal. Although that to the eastward is more direct and generally used, the latter has sufficient depth at low water for vessels of 13 feet draft.

Western Channel.—Pass about ¼ mile northward of the Spectacle Islands, and when approaching the main shore keep the southwest tangent of West Ironbound Island in range with the eastern point of the eastern Spectacle Island until the Episcopal Church bears 354°, when steer for the church until Krout Point opens westward of Bull Rock, about one-third the distance between the rock and the main shore, and then steer 28°. When the Episcopal Church bears 273°, alter course to 93° to avoid the southern end of Bull Spit; and when Krout Point bears 2° steer for it until approaching the point, and then alter course to pass midway between Krout and Fort points.

After passing these points continue on a northerly course until the spire of the church in Ritcys Cove appears nearly in range with the southern end of Parkes Island, when alter course to 292° and when the points of the entrance close, bearing 138°, good anchorage will be found in 5½ fathoms mud. Water may be obtained from a stream opposite this anchorage on the southwest shore.

To pass eastward of Cockawee Shoal avoid shutting in Mosher Island Lighthouse, and when Krout Point bears 2° steer for it, and on approaching the point proceed to the anchorage as before directed.

West Ironbound Island.—West Ironbound Island, nearly 1,400 yards long and 108 feet high, may be said to form the eastern entrance point of Lahave River.

West Ironbound Island Light, group flashing white, elevated 72 feet above high water, visible 13 miles, is exhibited from a white square lighthouse, 29 feet in height, with dwelling attached, standing near the edge of a cliff, 40 feet high, on the southern side of West Ironbound Island.

Shag Rock, which covers at high water, lies ¼ mile 70° from the northern end of West Ironbound Island. From it Gaff Point is just in range with the northern end of the western of the two Spectacle Islands.

Pollock Shoal, with a depth of 2½ fathoms over it, is situated off the eastern side of the entrance to Hartland Bay, with West Ironbound Island Lighthouse bearing 225°, about 1¾ miles, and southern extremity of Point Enrage bearing 334°.

A rock of small extent, with 2¾ fathoms over it, lies between Pollock Shoal and Point Enrage, but its exact position is not known.

Buoy.—A red can buoy is moored about 200 yards southeastward of Pollock Shoal.

Rose Bay, an indentation open to the eastward, 1.7 miles across, between Rose and Ovens points, is sheltered from northerly or westerly winds, but is too much exposed to afford safe anchorage except of a temporary nature. Similar remarks apply to Hartland and Kings bays, southwestward of Rose Bay, for both are exposed and unsafe.

The channel at the southern side of Rose Bay is marked by three black and three red spar buoys.

Light and whistle buoy.—A cylindrical steel buoy, painted red and black in horizontal bands, and surmounted by a pyramidal frame, supporting a whistle and lantern, from which an occulting white light is exhibited, is moored in 21 fathoms in the fairway off the southern entrance to Lunenburg Bay, about 1¾ miles 211° from Cross Island Lighthouse.

Lunenburg Bay, about 5 miles in depth and 2¼ miles in breadth between the entrance points, is open to the southeastward, but the force of gales from that quarter is much lessened by the position of Cross Island, which acts as a breakwater.

Lunenburg Harbor is situated at the head of Lunenburg Bay and is safe in all winds and affords good anchorage in 3 fathoms.

Channel—Wharves.—A channel, 200 feet wide and 20 feet deep at low water, leads from the entrance of the harbor to the railroad wharf. There is also a channel, 60 feet wide and 17 feet deep at low water, along the heads of all the wharves, 13 in number.

There are two tugs.

Breakwater.—A concrete breakwater under construction is to be 1,300 feet long.

The town, situated at the northern head, has a population of about 4,500.

Industries.—The principal industries are fishing, shipbuilding, engines, launches, and furniture.

The United States is represented by a consular agent.

Patent slips.—At Lunenburg there is a patent slip, 195 feet in length on cradle, with a lifting power of 900 tons and a draft forward of 9½ feet, aft 16 feet, and an electric marine railway with a capacity of 400 tons.

There is a good machine shop and three shipyards.

Supplies of all kinds can easily be obtained; water is supplied by a hose from dock and from lighters.

Communication.—There is a telegraph station at Lunenburg; the town is connected with the railroad system of the Dominion via Bridgewater and Middleton.

Lunenburg is connected with the Intercolonial by the Halifax & Southwestern and is the terminus of a railroad which connects the Annapolis Valley with the south coast of Nova Scotia. A railroad siding passes along the head of all the wharves' properties.

Hospital.—There is a marine hospital where seamen are received for treatment.

Coal.—Upward of 200 to 300 tons of coal are usually kept in stock.

Port of Lunenburg—Regulations.—No vessel within the limits of the port shall be anchored so as to swing at her anchors nearer to any wharf than 150 yards, excepting for the purpose of going alongside or leaving a wharf or in moving from one wharf to another, and then is not to remain any longer than is necessary for such purpose, unless from stress of weather or other unavoidable cause, to be judged by the harbor master.

All vessels anchored for the purpose of being laid up on the western side of the harbor must be anchored so as not to swing to the eastward of an imaginary line from the point of Seligs Head to the western corner of Lindsays Wharf, and all vessels anchored for the purpose of being laid up on the eastern side of the harbor must be so anchored as not to swing to the westward of an imaginary line from the willow trees on Battery Point to the eastern corner of Fincks Wharf.

Cross Island.—Cross Island, about 1½ miles long in an east-southeast and west-northwesterly direction, thickly wooded, the tops of trees being 95 feet high, lies immediately off the entrance of Lunenburg Bay, and is the outer object marking the western approach to Mahone Bay. The island is a little more than 1½ miles from East Point Ledge (always above water), but extensive shoal ground off the northern shore of the island narrows the navigable channels to a width of considerably less than 1 mile.

Pilots may be obtained on Cross Island.

Cross Island Light, group occulting white, elevated 100 feet above high water, visible 15 miles, is exhibited from a red lighthouse with an octagonal base, 58 feet high, on the eastern point of Cross Island.

Fog signal.—A foghorn, worked by compressed air, is sounded. The fog signal is installed in a white square wooden building, erected a short distance southeastward of the lighthouse.

Hounds Ledge, consisting of parallel ridges of rock nearly 1 mile in length east and west, lies off the northern shore of Cross Island; the eastern end of the ledge uncovers at two-thirds ebb. This ledge narrows the channel between it and East Point Ledge to less than 1 mile.

Pearl Island Lighthouse, bearing 64°, open northward of Big Duck Island, leads northward of this danger.

There is a rocky shoal 50 yards in extent, with a least depth of 20 feet, ¾ mile northward of the western end of Cross Island.

Light and bell buoy.—A cylindrical buoy, painted black and white in vertical stripes, and surmounted by a pyramidal frame supporting a bell and lantern, from which an occulting white light is exhibited, is moored in the northern entrance to Lunenburg Bay, about midway between East Point Ledge and Hounds Ledge.

From the buoy a 286° course leads clear of Sculpin Shoal and the intervening shoals up to Battery Point Light at the entrance to Lunenburg Harbor.

Ovens Point Rocks, off the point of that name, on the western side of Lunenburg Bay, generally uncover at low water, and always break during strong winds from seaward. The outer of these rocks lies 700 yards, in east and south directions, from the pitch of Ovens Point.

East Point is 2½ miles northward of Cross Island Lighthouse. East Point Ledge (always above water) extends 600 yards eastward from it.

East Point Rock is a small isolated patch, with about 1¼ fathoms water, ¼ mile from the nearest shore, situated with East Point Ledge bearing 47° nearly 1 mile.

East Point Gut Light, fixed white, 27 feet above high water, visible 10 miles, is exhibited from a white pole 20 feet in height erected on the northern side of the entrance to East Point Harbor.

Sculpin Shoal consists of a series of rocky ridges ½ mile in length northeast by east and southwest by west, and has only ½ fathom water on its shoalest part, near the western end, lies midway between Blue Rock Island and the cliffs on the northern side of Ovens Point; from it the large church tower of Lunenburg is seen through the gap eastward of Battery Point, bearing 313°. This shoal breaks in a heavy sea.

Light and bell buoy.—A red cylindrical light and bell buoy surmounted by a steel frame supporting a bell and lantern, from which an occulting red light is shown, is moored ¼ mile southwestward of the 3-foot patch on the western end of Sculpin Shoal.

From the light and bell buoy a 309° course leads to the red conical buoy off Battery Point and clear of all dangers.

Buoys.—A black can buoy is moored on the northeastern side of Sculpin Shoal, in 4¾ fathoms.

The buoys in Lunenburg Harbor are kept in place all the year round, but in the winter can buoys are replaced by spar buoys.

Outer Middle Rock, nearly in the middle of the bay, has 2½ fathoms water on its shoalest part, from which Battery Point Lighthouse bears 321°, and Big Duck Island is open its apparent breadth southward of East Point Ledge. It breaks in a heavy sea.

Inner Middle Rock, of small extent, has 2¼ fathoms water on it, and lies with Battery Point bearing 329° and the southern point of Big Duck Island in range with East Point Ledge.

Shingles.—A stony ridge 1,400 yards long northwest and southeast, the northern end of which uncovers at half ebb, is about ½ mile northward of Mosher Head.

Black spar buoys have been placed to mark the northwestern and southeastern ends of the northern or shoaler portion of the Shingles Ledge; these buoys lie, respectively, in depths of 1 and 2 fathoms.

Long Shoal.—A rocky patch 700 yards long, has less than ¾ fathom water on its shoalest part, from which Battery Point bears 0° nearly ½ mile.

A black mooring buoy lies on the eastern edge of the Long Shoal in 4¼ fathoms; a black spar buoy, in 3 fathoms, marks the northern end of this shoal.

Battery Point Buoy.—A red conical buoy, moored in 3 fathoms, marks the end of the spit projecting southward from Battery Point.

Rocky Shoal.—A rocky shoal, about 100 yards in extent, and with a least depth over it of 4 fathoms at low-water springs, is situated about 600 yards eastward of Long Shoal, and 1,250 yards 135° from Battery Point Lighthouse. This shoal lies in the fairway of the entrance to Lunenburg Harbor, and should be left on the port hand in entering.

Battery Point Light, fixed red, elevated 81 feet above high water, visible 11 miles, is exhibited from a white square wooden building, 24 feet in height, situated on Battery Point, the eastern entrance of Lunenburg Harbor.

Fog signal.—A hand foghorn is sounded at Battery Point Lighthouse in answer to vessels.

Moreau Point Rock, a rocky spit extending in a southeasterly direction from Moreau Point, has only ½ fathom water on its shoalest part, which is about 300 yards from the nearest high-water shore.

Buoy.—Moreau Point Spit is marked at its outer point by a black can buoy moored in 3½ fathoms.

Directions—Lunenburg Harbor.—If from the southward, Rose Point, which is steep-to, may be passed at a moderate offing. From a position ½ mile eastward of Rose Point steer 346° until Moreau and Battery Points are apparently just in range, bearing 310°, and proceed with these objects in range westward of Sculpin Shoal and eastward of Outer and Inner Middle rocks.

On approaching the lighthouse keep to the westward until Moreau Point bears 318°, which will lead eastward of Long Shoal and clear of the spit off Battery Point, after passing which steer for the town of Lunenburg and anchor in 2¾ fathoms mud, with the lighthouse bearing 149° and Moreau Point bearing 243°. Smaller vessels may anchor nearer the town, toward which the water gradually shoals.

A good berth for a vessel 300 feet in length, drawing 20 feet, is with Battery Point Lighthouse bearing 59° 450 yards. In this position the vessel will be afloat at all times of the tide in 5 to 6 fathoms soft mud.

Approaching from the eastward, northward of Cross Island, Lunenburg Lighthouse, bearing 289°, will clear Hounds Ledge and East Point Rock, and when the southern end of Big Duck Island appears in range with the southern tangent of East Point steer 273°, with this mark astern, until Moreau and Battery Points are apparently just in range, when steer for them until Ovens and Rose Points are in range. Thence steer to the northwestward until Moreau Point bears 318°, when proceed as before directed.

Coast.—Between Cross Island and Mars Head, 20½ miles in an east-northeasterly direction, the coast recedes and forms an extensive bight, comprising Mahone and St. Margaret Bays, which are separated from each other by Aspotogan Peninsula, remarkable on account of a wooded ridge, 480 feet above the sea, extending across its neck. This peninsula terminates in New Harbor Point, which lies 7 miles within the line between Cross Island and Mars Head.

Between the entrance of St. Margaret Bay and Mars Head, a distance of 10 miles, the coast has a general trend to the southeast, but is very irregular in outline and deeply indented, the whole coast, including numerous islands, being composed of white granite, generally bare. In some parts the shore attains an elevation of 70 feet and gradually increases toward the interior. In this stretch of coast there are four anchorages which in case of necessity may be used by strangers, viz, Port Dover, Blind and Shag bays, and Prospect Harbor.

Mahone Bay is separated from St. Margaret Bay by Aspotogan Peninsula, the highlands of which may be seen in the offing from a distance of more than 20 miles.

The entrance of the bay lies between the eastern point of Lunenburg Promontory and New Harbor Point at the end of Aspotogan Peninsula, 9 miles to the northeastward. There are numerous islands in the bay, the largest of which are Great and Little Tancook, on the eastern side, near the entrance.

The eastern shore of the bay is steep-to and comparatively free from dangers, but on the western side rocks and sunken shoals are almost innumerable. Between the eastern point of Lunenburg Promontory and Chockle Cap Islet, to the northward, are a series of parallel ridges lying east and west, extending in some places considerably beyond the general direction of the shore and forming a confused mass of rocks, rendering any intelligible description impossible.

Many of the rocks uncover at low water, and show themselves more than ½ mile from the high water line.

In the part of Mahone Bay situated between Great Tancook and Refuse Islands and the islands forming Chester Harbor the water is generally deep, over a muddy bottom; but there are several dangers, composed of bowlders, gravel, and sand, some of which are near the surface and steep-to.

As a detailed description of all the dangers in Mahone Bay would be impracticable, it is intended to allude only to those affecting the navigation of the principal channels.

Fogs.—During the fogs which frequently prevail on this coast during July and August, when the wind is to the westward of south, the southwest side of Mahone Bay is generally clear.

Big Duck Island, about 700 yards long and 45 feet high, lies 2 miles 23° from the eastern end of Cross Island; the 5-fathom curve around this island is about ¼ mile from the shore. A shoal extends 400 yards northward and eastward from the island.

Little Duck Island.—About 1¼ miles 40° from East Point is Little Duck Island, which should always be passed on the east or outside; its shores can be safely approached to a distance of ¼ mile.

Tanner Island Light, fixed white, 29 feet above high water, visible 10 miles, is exhibited from a square, white wooden tower on the eastern end of Tanner Island.

Middle Ledge, composed of parallel rocky ridges, has ½ fathom on its shoalest spot, about 2 miles 21° from the eastern point of Big Duck Island.

There is a rocky patch of 4 fathoms 1 mile southward of Middle Ledge.

A red conical buoy is moored in 7 fathoms off the western end of Middle Ledge.

Clearing marks.—Cross Island Lighthouse, seen open eastward of Big Duck Island, bearing 211°, leads eastward and the lighthouse in range with the western end of the island, bearing 202°, leads westward of Middle Ledge. There are no good range clearing marks, but a vessel will be northward of the danger with the southern point of Pearl Harbor bearing 93°.

Pearl Island, about 700 yards long and 40 feet high, is 6½ miles 50° from Cross Island Lighthouse.

Pearl Island Light, group occulting white, elevated 66 feet above high water, visible 13 miles, is exhibited from a white square wooden building, 28 feet in height, and attached to the dwelling erected on the southern point of Pearl Island.

South Rock, with a depth of 2½ fathoms, is of small extent and lies about 200 yards off the southern end of Pearl Island, from which it is separated by a narrow deep-water channel.

Northeast Shoal, nearly 2 miles from Pearl Island Lighthouse, is about ¼ mile in extent, and from its shallowest part (near the center), with only ½ fathom water, the eastern end of Little Tancook Island is just seen eastward of East Ironbound Island, bearing 312°, the nearest part of the latter island being distant 2¼ miles. The northern extremity of Cross Island is just in sight northward of Big Duck Island.

Clearing mark.—To pass eastward of this danger keep the whole of Little Tancook Island open eastward of East Ironbound Island, and to pass westward bring the eastern point of Great Tancook Island in range with the western point of East Ironbound Island, bearing 309°.

This shoal breaks near low water during a heavy swell.

Light and whistle buoy.—A black cylindrical buoy, marked "N. E. Shoal" in white surmounted by a steel frame carrying a whistle and lantern, from which an occulting white light is exhibited, is moored in 21 fathoms, about 1¾ miles 54° from the center of Northeast Shoal.

East Ironbound Island is about 1,800 yards long and attains an elevation of 60 feet. It lies 1½ miles southward from the extremity of Aspotogan Peninsula, and is clear on all sides ¼ mile from the shore.

East Ironbound Island Light, fixed white, 150 feet above high water, visible 16 miles, is exhibited from a white square tower, 46 feet in height, on an oblong white dwelling, on the highest part and a little to the eastward of the center of East Ironbound Island. The lantern only is visible, the building being hidden by trees.

Fog signal.—A hand foghorn is sounded in answer to vessels.

Flat Island, about 1,400 yards long, is somewhat remarkable in shape; on the northern end is a narrow eminence 40 feet high, while the remainder of the island is very low. The island lies about 1½ miles southwestward of East Ironbound Island, with a deep water channel between, but a flat with less than 5 fathoms extends nearly ½ mile eastward from the middle part of the island.

South Shoal, a small detached rocky patch with 2¾ fathoms over it, lies 700 yards to the southward of Flat Island, with the southwestern points of Flat and Great Tancook islands in range.

A rocky patch with a least depth of 3½ fathoms lies 700 yards 93° from South Shoal.

Bull Rock, a small rocky ridge, the highest part of which uncovers at half ebb, can be approached to a distance of 250 yards, except on its eastern side, where there is only 2¾ fathoms at nearly 300 yards from the rock. Bull Rock lies 1 mile 244° from the southwestern end of Flat Island, the channel between being clear.

Clearing marks.—The northern end of East Ironbound Island, seen open northward of Flat Island, leads northward; East Ironbound Lighthouse, open southward of Flat Island, leads southward; and Little Duck Island, apparently in range with the western end of Cross Island, bearing 197°, leads westward of Bull Rock. The deep water passage on the western side of Bull Rock is the main channel into Mahone Bay and is about 2 miles across.

Great Tancook Island, the largest of the numerous islands studding Mahone Bay, is about 2 miles long and 115 feet high, with an indentation named Southeast Cove on its eastern side. The island lies at the entrance of the bay, nearly midway between Aspotogan Peninsula and the southwestern shore and has a small population.

Wreck buoy.—A green can buoy is moored in 16 fathoms ½ mile 125° from South Head to mark a wreck.

West Shoals, on the western side of Great Tancook Island, are three in number, but two only are sufficiently off-lying to require description. The southernmost is about 700 yards long and the same distance offshore, with 2¼ fathoms on its shoalest part and deep water between it and the island shore.

Clearing marks.—The northern end of East Ironbound Island, in range with the southern end of Great Tancook Island bearing 85°, leads southward of this shoal, and the lighthouse on Quaker Island, bearing 341°, leads westward.

The middle shoal, detached and nearly circular in form, is 700 yards in diameter, with less than 1 foot water on its shoalest part, which lies 700 yards 267° from the elbow of the shingle beach on the western side of Great Tancook Island and 1,400 yards 340° from the southern shoal. Within the middle shoal to the northeastward is the third shoal, of smaller dimensions, with 2¼ fathoms on it, ¼ mile from the island shore.

Star Island Ledges.—Star Island, small and low, lies about 700 yards off the northwesterly end of Great Tancook Island and may be considered the westernmost of three ledges about the same distance offshore.

The one next eastward of Star Island is composed of bowlders which uncover at half ebb, while only a small portion of the eastern ledge, which is composed of gravel, dries at low water. From this spot the tree on Star Island bears 239° 800 yards, and the shoal extends 700 yards to the northwestward, where the depth is 5 fathoms.

On the inshore side of these two latter ledges is a narrow channel with 2¾ to 4 fathoms water. The northern shore of Great Tancook Island requires an offing of at least ½ mile.

Little Tancook Island, ¾ mile long and 80 feet high, occupies a nearly central position between Great Tancook Island and Dares (Indian) Point at the southwestern extremity of Aspotogan Peninsula. There are available channels on either side of the island, that on the western side being the more direct of the two, except for vessels of moderate draft.

Southeast Shoals consist of a cluster of detached shoals, over which the depths vary from 2¾ to 5 fathoms; the shoalest, with 2¾ fathoms water, lies with the southern point of Little Tancook Island bearing 315°, about ½ mile, and Grassy Island bearing 225°, nearly 1½ miles. From this danger the center of Pearl Island is in range with the western end of East Ironbound Island bearing 148°.

Hobson Island, on the southwestern side of Mahone Bay, is remarkable from its being a grass-covered earthy mound 30 feet above the sea on a gravelly spit which dries 700 yards at low water. This islet should not be approached within ¼ mile.

Hobson Island Light, fixed red, elevated 68 feet above high water, visible 8 miles, is exhibited from a white square lighthouse 29 feet in height on Hobson Island.

Heckman Anchorage, to the southward of Hobson Island, is perfectly safe, with a good depth of water over mud, but the channels leading to it, though deep, are rendered tortuous by several shoals which lie between Hobson Island and the anchorage, and as no range marks can be given a stranger should not attempt the anchorage without a pilot.

Tides.—High water interval at Heckman Anchorage is 7h. 45m.; spring range 7½ feet, mean range 6 feet.

Princes Inlet, on the southern side of Harmon Island, though small in extent, affords safe anchorage in 6 or 7 fathoms, mud. From an offing of about 700 yards northward of Hobson Island steer 261° for the southern point of Bockman Island; this course will clear the spits off Bluff Head and Sandy Cove. After passing the latter steer to pass midway between Bockman Island and the main shore, and on nearing Little Harmon Island keep over toward the main shore in order to avoid shoal water off the latter island, and anchor between Harmon Island and the main.

Buoys.—The following buoys are moored in the approach to Princes Inlet:

A black spar buoy at the eastern end of Bluff Head Shoal.

A black spar buoy at the western end of Bluff Head Shoal.

A black spar buoy off Brockman Head Shoal.

A spar buoy, painted red and black in horizontal bands, eastward of Bockman Shoal.

A red spar buoy southeastward of Little Harmon Island.

A red spar buoy southward of Little Harmon Island.

Mahone Harbor, on the western side of Mahone Bay, affords secure and well sheltered anchorage in about 6 fathoms, but is difficult of access in consequence of the numerous off-lying dangers.

The entrance to the channel leading to Mahone Harbor and Princes Inlet lies between Hobson Island on the south and Haddock Shoal on the north, the latter being the southern rise of the shoal ground extending from Refuse and Mason islands.

Wharves.—There are several wharves in this harbor, one of which has 16 feet of water at its head, low water.

Repairs.—There are four shipyards where small vessels are built for the fishing industry.

Buoys—Beacon.—The approach to the harbor is buoyed; there is also a beacon on a shoal just below the wharves.

The town contains a hotel, saw and planing mills; lumbering, fishing, and shipbuilding are carried on; it has a population of about 1,600.

Communication.—It is connected by railroad and telegraph with the Dominion systems. There is steamer connection with Lunenburg.

Coasting steamers engaged in passenger and freight traffic call at this harbor.

Refuse Island.—This island and adjacent shoals lie on the western side of the main channel into Mahone Bay, opposite Great Tancook Island, and with the western shoals of the latter island the navigable channel is narrowed to 1 mile.

Kaulback Island Range Lights, fixed white, 36 feet above high water, visible 8 miles from all points of approach by water, is exhibited from an inclosed white wooden tower, square in plan with sloping sides, surmounted by a square lantern, erected on the northeastern end of Kaulback Island.

Rear light, fixed white, 68 feet above high water, visible 6 miles in the line of range, is exhibited from an inclosed, white, wooden tower, square in plan with sloping sides, surmounted by a square lantern, erected 370 feet 268° from the front light.

Directions.—The lights in range bearing 268° will lead between Young Ledge and Bella Shoal and between the shoal extending southward from Young Island and the shoal extending northward from Bella Island.

East Shoal is small and rocky, with 4 fathoms on it, and deep water all around; from this shoal the high earth cliff on the southeastern point of Refuse Island bears 247°, ¾ mile.

Within East Shoal is East Spit, extending from the northeastern point of the island nearly ½ mile, in an east by south direction; there is a depth of only 2¾ fathoms on this spit, more than 700 yards from the high-water line of Refuse Island.

Southeast Shoal is detached and narrow, 700 yards long, with 3¼ fathoms least water on it; this spot lies ¾ mile 126° from the high cliff on the southern side of Refuse Island.

South Shoal, nearly ½ mile long, north by west and south by east, and 700 yards broad, is separated from the southern side of Refuse Island by a narrow 5-fathom channel, and has its shoalest part with a depth of 2½ fathoms on the western end.

From its outer and southern end, with 3 fathoms water, the high cliff of Refuse Island bears 5°, 1,400 yards.

Mason Spit is a stony ridge off the southeast end of Mason Island, 1,400 yards long. At 700 yards distance from the island shore a small portion of the northwestern part of the spit dries at low water.

Haddock Shoal, small, with 3 fathoms water, lies 1.3 miles 346° from Hobson Island. From the shoal East Ironbound Island Lighthouse is seen just open southward of Great Tancook Island.

Gull Ledge lies on the northern side of the channel leading to Mahone Harbor. Near the center of the ledge is a remarkable granite bowlder, which can always be seen, being about 2 feet above high-water springs. From the bowlder shoal water extends 600 yards in a southeasterly direction.

Southwest Ledge, about ½ mile long, ¼ mile in breadth, and steep-to, especially on its southwestern side, is separated from Gull Ledge by a narrow channel of deep water. From its shoalest part near the center, covered with ¾ fathom, the northern point of East Ironbound Island is just shut in with the southern end of Great Tancook Island.

Buoy.—A red conical buoy is moored in 7 fathoms of water off the southwestern edge of Southwest Ledge.

Middle Patch, of small extent, with a depth of 3½ fathoms, lies in mid-channel with deep water close-to. From it Bluff Head bears 174°, 1,600 yards.

Bockman Shoal, about ¼ mile long, has 1¾ fathoms water on its western end, from which the northern point of Bockman Island bears 264°, the nearest part of the island being ½ mile distant.

Coveys Ledge, consisting of detached bowlders, uncovers at half ebb, its eastern end being ¼ mile in an easterly direction from the northeastern end of Coveys Island. Between the ledge and island is a boat channel with 4 feet water. The ledge should not be approached nearer than 200 yards.

Trappean Shoal, a small rocky patch covered with 4 fathoms, lies with Goat Island bearing 59°, distant ½ mile.

Andrew Shoal, about 400 yards long, has only 1 foot water on its shoalest part, which is equidistant from Andrew and Westhaver islands, and lies with the center of Goat Island in range with the southwestern point of Rous Island.

Westhaver Island Light, fixed white, elevated 54 feet above high water, visible 12 miles, is exhibited from a white square wooden tower, 27 feet in height, with red lantern, on Westhaver Island at the entrance of Mahone Harbor. A small white dwelling house adjoins the tower.

Directions.—Vessels off Hobson Island and bound for Mahone Harbor should bring Hobson Island Lighthouse to bear 109°, and by steering 289° will pass southward of the Middle Patch and northward of Bockman Shoal and Coveys Ledge.

When the eastern point of Coveys Island appears in range with the western end of Bockman Island, alter course to 267° until approaching Westhaver Island, when the channel southward of Westhaver Island or northward of Ham Island must be decided on; but if without local knowledge, the former channel is recommended as being the less circuitous of the two. Westhaver Island being steep-to on its western side, may be approached close-to.

Anchorage.—Good anchorage is obtained in 5 or 6 fathoms, mud, inside Ham Island to the northwestward. Good anchorage may also be had between Trappean Island and the northern side of Harmon Island in 7 fathoms, mud, with the southern point of Refuse Island just shut in with the northern end of Trappean Island.

Coachman Ledge is ½ mile long, 357° and 177°, between the 5-fathom curve; its highest part uncovers at two-thirds ebb, and at low water about 100 yards is visible. The center of this spot lies with Star Island Tree bearing 194°, 1.9 miles.

Buoys.—A black can buoy is moored on the northern end of Coachman Ledge, and a red spar buoy with a conical topmark is moored in a depth of 6 fathoms off the southern end of the ledge.

Southwest Coachman, a small patch with 4½ fathoms water on it, lies with that part of Coachman Ledge which dries, bearing 22°, 1,400 yards.

Northeast Coachman is another small patch with 4½ fathoms, from which that part of Coachman Ledge which dries, bears 191°, about ¾ mile.

Middle Shoal is nearly ¼ mile long, having on its shoalest part a depth of 3 fathoms; from it Quaker Island Lighthouse bears 316°, about 1½ miles, and the eastern end of Snake Island bears 32°.

Quaker Shoal, about 400 yards in length, has a depth of 4 fathoms on its shoalest part, from which Quaker Island Lighthouse bears about 2°, 1.3 miles.

Quaker Island Light, fixed red, elevated 109 feet above high water, visible 11 miles, is exhibited from a white square lighthouse, 35 feet in height, erected on the summit of Quaker Island. This light is intended as a guide to Chester Basin.

Fog signal.—A hand foghorn is sounded at Quaker Island Lighthouse.

Birch Shoal, 400 yards long, has a depth of only 2½ fathoms at the center, from whence the southern point of Birch Island bears 11°, 800 yards.

Lynch Shoal is about ¼ mile long, northwest and southeast, with only 1½ fathoms water on it; from this depth the northern end of Clay Island is apparently just in range with the southern cliffy point of Quaker Island, and the southern point of Lynch Island bears 56°, about ½ mile.

Sheep Ledge consists of bowlders, the highest of which only cover during extraordinary spring tides; from this point the ledge extends 100 yards northward and nearly 400 yards southward, and at low water in this latter direction it uncovers about 200 yards.

From the highest part of the ledge the southern points of Birch and Quaker islands are in range, bearing 67°.

Clay Island Spit projects in a southeasterly direction from the southern end of Clay Island; upon it at a distance of 400 yards there is a depth of 2 fathoms and of 3½ fathoms at a distance of ½ mile from the island. An irregular ridge covered with 4 fathoms extends to the northeast and joins the shallow water off the northwest end of Quaker Island, the whole forming a crooked bar composed of sand, gravel, and bowlders.

Clearing mark.—Chester churches just open eastward of Peninsula Point, bearing 358°, clears the eastern edge of Clay Island Spit in 4 fathoms, and the southern end of Woody Island just open southward of Quaker Island, bearing 67°, clears the southern edge of the spit.

Buoy.—A black spar buoy is moored in about 2 fathoms at the southeastern extremity of the inner part of Clay Island Spit.

Big Fish Shoal is a small isolated rise, with a depth of 4¼ fathoms over it, from whence the southern point of Big Fish Island bears 354°, ¼ mile.

Chester Rock, a small rocky patch with about 1¾ fathoms water, lies immediately off the entrance of Chester Creek, and a little westward of the range between Norse Point and the neck of the peninsula.

Buoy.—A can buoy, painted in red and black horizontal bands, is moored on the center of the Chester Rock, and may be passed at a distance of 30 yards on either side.

Garrets Cove, between Norse Point and Zink Head, is shoal.

Norse Point.—From Norse Point a ridge of bowlders extends in a south-southeasterly direction, terminating at a distance of nearly 200 yards from the point in a bowlder with only 1½ fathoms water. Zink Head, to the southeastward, may be approached to a distance of 200 yards.

Lobster Claws are two stony ridges. The eastern, a small portion of which uncovers in low-water springs, at about 400 yards from Lobster Point, extends from that point nearly ½ mile 146°. The western ridge is detached and about ¼ mile in length, with deep water all around. From the shoalest spot, with 1¾ fathoms, Lobster Point bears 8°, 700 yards.

Clearing marks.—Peninsula Point, apparently just in range with the northern end of Norse Island, bearing 261°, clears the southern edge of the eastern ridge; and the northern end of Norse Island bearing 270°, having Peninsula Point shut in behind it, clears the southern edge of the western ridge.

The eastern ridge, extending from Lobster Point, is marked by a red spar buoy, moored off its southern extremity.

Mountain Shoals, three in number, lie southeastward of Mountain Island. The westernmost of the three is 700 yards in length and 100 yards in breadth. On its shoalest part the depth is only 1½ fathoms, from which the southern point of Mountain Island bears 295°, distant ¼ mile.

The middle of the three shoals, with 3¼ fathoms water, is 200 yards in length and lies with the southern point of Mountain Island bearing 295°, distant about 1,400 yards.

The outer shoal is a small patch with 4¾ fathoms, and from it the southern point of Mountain Island bears 284°, distant nearly 1 mile.

Spectacle Shoal extends off the eastern side of Saddle Island, and is 700 yards long in a 337° and 157° direction, with its center showing at low-water springs, from which the southeastern end of Saddle Island bears 208°, distant 300 yards.

Long Spit takes its rise from the main shore between Lobster Point and Graves Island and extends in a southeast direction for

¾ mile, with a breadth of about ¼ mile. The spit is composed of bowlders, stones, and gravel, and uncovers as far out as 700 yards from the shore; near the end of the dry part some large bowlders show at half ebb.

Snake Spit, having only 1 foot water on its extremity, extends ¼ mile from the southwestern side of Snake Island. There is a deep-water channel, ¼ mile wide, between Snake Spit and Spectacle Shoal.

Graves Shoal, nearly circular in form and detached, is small in extent, with only ½ fathom water on its shoalest part, from which the southern point of Graves Island bears 312° nearly 1,400 yards, and Lobster Point 227° nearly 1 mile.

Graves Shoal is marked at its northern extremity by a black spar buoy and at its southern edge by a red spar buoy.

Blandford Head, on the western side of the Aspotogan Peninsula, is steep-to and lies on the southern side of Shoal Cove, where, as the name implies, the water is shoal. From Coachman Head, on the northern side of the cove, the shore in a northerly direction is clear of danger to a point ½ mile southward of Little East River; from this position to Rous Point (at the western entrance of the river) the shore should not be approached within ¼ mile, in order to avoid several off-lying rocks. The bay between Rous Point and East River Point should be avoided, in consequence of shoal water and rocks.

Blandford Shoal, a small detached 4-fathom patch, lies 800 yards 244° from Blandford Head, and ¾ mile 315° from Dares (Indian) Point. Midway between Blandford Head and this shoal there is a patch of 4¾ fathoms.

One mile 306° from Blandford Shoal there is a small rocky patch of 5 fathoms, from which Coachman Head bears 64°, about 1 mile.

Chester Harbor is commodious, safe, and comparatively easy of access. The town is laid out with due regard to regularity, the streets being at right angles to each other. A large portion of the population is engaged in the fisheries or lumber trade; a considerable amount of farm produce is raised, and a good business is carried on in manufacturing fish barrels for the outports.

The harbor is 1 mile wide and 1½ long.

There are two channels into the harbor, the one to the southward being more direct than that to the eastward, which is narrow and somewhat intricate.

Wharves.—There are three wharves in the harbor, at which the water is 3 fathoms in depth at the head, at low water, and three wharves where vessels load at high tide.

Anchorage.—The anchorage is in a depth of 6 to 8 fathoms, mud, with the northern ends of Norse and Mountain islands in range, and the western ends of Norse and Quaker islands also in range.

Communication.—There is a telegraph station at Chester.

Tides.—High water interval at Chester Harbor is 7h. 30m.; spring range, 7½ feet; mean range, 6.1 feet.

The general surface of the water is raised a foot by southeasterly gales, and depressed the same amount by northwesterly gales. In the northern portion of Mahone Bay the tidal current is sluggish, but through the eastern Tancook Channel it runs at a velocity of 1 knot per hour during its full strength; and through the narrow part of the western Tancook Channel the tide attains a velocity of 2 knots an hour, the flood setting to the northward, and the ebb to the southward.

Directions, through the Tancook channels.—If from the eastward, being southward of Seal Ledge, and Dares Point, bearing 299° being open of New Harbor Point, to proceed through the eastern channel, steer to pass mid-channel between Dares Point and the northern end of Little Tancook Island, taking care not to approach the land between Herring and New Harbor points nearer than about 400 yards, and avoiding the 4¾ fathoms patch off Dares Point.

By the western channel, when clear of the Seal Ledge as before steer so as to pass to the southward of the Southeast Shoals, which may be done by keeping Southwest Island open of Herring Point; when Pearl Island is open its own apparent breadth westward of East Ironbound Island, the Southeast Shoals will have been passed, and a more northerly course may be steered for the channel. Bear in mind that the western point of Little Tancook Island may be passed within 200 yards, but that when past that point care must be taken not to close the northeastern side of Great Tancook Island nearer than 600 yards.

From a position midway between Little Tancook Island and Dares (Indian) Point, a vessel making for Chester Harbor should steer northwestward clear of Mountain Shoals, until the northern points of Norse and Mountain islands are in range, and then alter course so as to pass 200 yards off the northern end of Mountain Island.

When Mark Island opens out westward of Mountain Island, steer to clear the Lobster Claws, and after passing them (which will be known by Lynch Island opening out westward of Woody Island) alter course so as to pass mid-channel between Zink Head and Norse Island, and come to in the anchorage described above.

A more direct channel into Chester Harbor is that between Mountain and Mark islands, and when the northern point of Lynch Island appears in range with the southern end of Woody Island, bearing 210°, Mark Island Spit will have been passed, and the course should be altered so as to pass midway between Norse Island and Zink Head, and anchor as before directed.

A sailing vessel passing through the eastern Tancook Channel with a southwesterly wind, when the northern point of Little Tancook Island bears 272° should haul close around it, and steer to pass to the southward of Coachman Ledge, marked by a red buoy. When Chester Churches, bearing 318°, appear midway between Woody and Lynch islands, alter course for the southern point of Quaker Island, so as to pass between Middle and Lynch shoals.

On approaching Quaker Island, keep a good 200 yards off its southwest side until Chester Churches appear nearly in range with the eastern side of the Peninsula, bearing 358°, when alter course for them, until the southern point of Norse Island opens to the northward of the stony point on the northern side of Quaker Island, east; then keep more to the eastward and anchor as before directed.

If, with a westerly wind, a vessel has run through the western Tancook Channel, and proceeded sufficiently far to the northward to clear the shoal ground off the northeastern side of Great Tancook Island, steer so as to pass southward of Coachman Ledge, until Chester Churches open westward of Woody Island, as before mentioned, when steer for the southwestern side of Quaker Island, and proceed as before directed.

When approaching Chester Harbor from an offing eastward of Cross Island, steer to pass at a safe distance eastward or westward of Big Duck Island and thence for the channel westward of Great Tancook Island, bearing in mind that the middle of Little Duck Island in range 168° with Cross Island Lighthouse leads through the middle of the above channel, and that any part of Little Duck Island in range with Cross Island Lighthouse will clear the dangers which lie off the western side of Great Tancook Island and the eastern side of Refuse Island, respectively.

Having passed East Shoal, Refuse Island, steer to the northward for Quaker Island Lighthouse and proceed in accordance with previous directions.

With an easterly wind and northward of Great Tancook West Shoals haul up, and after passing at a safe distance from Star Island, bring it and the western side of Great Tancook Island in range bearing 168° and with these marks in range proceed between Coachman Ledge and Middle Shoal and steer mid-channel between Mark and Woody Islands, continuing on until the northwest point of Quaker Island appears in range with the southern point of Norse Island, when alter course to the northwestward to pass midway between Zink Head and the northern side of Norse Island, anchoring as before directed.

Chester Basin.—Good anchorage will be obtained northwestward of Chester Harbor in the northwest angle of Mahone Bay, at the head of which is Chester Basin; the entrance to this arm of the sea lies between Clay and Frog Islands, but there are several dangers to be avoided, for the positions of which the mariner is referred to the chart.

Directions.—Being westward of Birch Island, bring the southwest extremity of Great Tancook Island open westward of Birch Island, two-thirds the apparent breadth of the latter island, bearing 141°; this mark will lead up the northwestern arm in safety between the shoals, and anchorage may be selected according to circumstances.

Clay Island Spit.—A red spar buoy is moored off the southern extremity of Clay Island Spit.

South Gooseberry Shoal.—South Gooseberry Shoal, situated about ¾ mile 310° from Clay Island, is marked at its northern and southern extremities by red spar buoys.

Big Gooseberry Island is marked on its northern end by a red spar buoy and on its southern end by a black spar buoy.

Warnes Ledge.—Warnes Ledge, situated ¾ mile northwestward of South Gooseberry Ledge, is marked on its northeastern side by a black spar buoy.

Borgels Point.—A red spar buoy marks the extremity of the shoal extending from Borgels Point, the western point of the entrance to Chester Basin.

Gold River.—The channel into the Gold River is marked by red and black buoys. The red buoys should be passed on the starboard hand and the black buoys on the port hand when entering the river.

New Harbor is situated on the western side of the extreme southern part of the Aspotogan Peninsula.

A cylindrical gas and bell buoy, painted black and white in vertical stripes and showing an occulting white light, is moored about ¾ mile westward of the harbor entrance.

New Harbor Light, fixed red, 32 feet above high water, visible 7 miles, is exhibited from a pole, with shed at the base, situated on the southern side of the entrance to New Harbor.

Seal Ledge, about 2 miles northeastward from East Ironbound Island, consists of broken ridges of rocks, which cover at half flood, and generally show a break. The highest part of the ledge uncovers at low water for about 200 yards, and lies nearly 1 mile 112° from Herring Point, with a deepwater channel between.

Clearing mark.—The northern point of Little Tancook Island seen a little open southward of New Harbor Point, bearing 284°, clears the ledge on its southern side.

A black can buoy, moored in a depth of 7 fathoms, marks the edge of the shoal extending out from the eastern side of Aspotogan Peninsula.

Gravel Island Ledges lie off the southern end of Gravel Island, with which they are connected by shallow bars of shingle. The outer shoal uncovers at half ebb and a low water shows a full ¼ mile of its length. Its highest point is nearly ½ mile 194° from the southern point of Gravel Island.

The inner shoal, which uncovers at quarter ebb, lies ¼ mile 160° from the same point and dries about half the size of the outer shoal. About 200 yards southeastward of the inner shoal is a small rock with only 1 foot water.

There are no good clearing marks for these shoals, but White Point, kept to the northward of about 25°, will lead southeastward of the eastern point of Gravel Island bearing 329° and the center of Seal Ledge (when showing) in range with the western end of East Ironbound Island, bearing 227°, will lead southward of Gravel Island Shoals.

There is an irregular rocky shoal about 100 yards in extent having a least depth of 3 fathoms situated ½ mile southeastward of the eastern point of Gravel Island.

An irregular rocky shoal about 100 yards in extent having a least depth of 3 fathoms, is situated within the 5 fathom curve, 1¼ miles southward of Gravel Island.

Clearing marks.—The east side of Owl Head in range with the eastern extremity of White Point clears these two shoals.

Aspotogan Harbor is a small bight ¾ mile wide on the eastern side of Aspotogan Peninsula, about 3 miles northeastward of Herring Point, extending north-northwestward for a distance of about 1 mile.

Black Island is a small rocky island ¼ mile in extent and 88 feet high, situated in the northern entrance to Aspotogan Harbor, about ½ mile 34° from the northern point of Gravel Island.

There is a rocky shoal about 50 yards in extent having a least depth of 4 fathoms, situated about ¼ mile westward of the southern extremity of Black Island.

Horseshoe Ledge lies 3 miles westward of Peggy Point Light; it consists of ridges of rock which uncover at half ebb. It extends in a northwesterly and southeasterly direction and within the 5-fathom curve is fully ½ mile long and about ¼ mile broad.

From the highest part of the ledge East Ironbound Island Lighthouse bears 243°, 4.7 miles. The position of this danger when covered is generally shown by a break, unless with an unusually smooth sea.

Bell buoy.—A red bell buoy, with 'Horseshoe Ledge" in white letters, is moored in 11 fathoms of water 700 yards 115° from Horseshoe Ledge.

St. Margaret Bay, a recess of the sea about 25 miles in circumference and 9 miles in depth, is unusually clear of dangers compared with other portions of this coast; but there are several rocky banks with irregular soundings over them about 2 miles from the head of the bay.

There are several small harbors in the bay used by vessels engaged in the fisheries. The bay is open for navigation all the year as a general thing.

Its entrance between Southwest Island and Middle Point, eastward of the island, is about 2½ miles in width, but is contracted to 1½ miles just within the points mentioned by Charley and Middle Point Rocks, both off-lying.

Southwest Island, ½ mile long and 40 feet high, forms the salient point on the western side of St. Margaret Bay; the eastern sides of the island can be approached to 100 yards. Farther to the northward the shores of Owl Head and Horse Island are steep-to.

Charley Rock, small and dangerous, with 1¾ fathoms on it, and deep water all around, lies ½ mile 51° from the southern point of Southwest Island.

Clearing marks.—The tangent of Herring Point apparently touching the southern point of Southwest Island leads eastward, and White Point in range with the northern point of Southwest Island leads northward, of Charley Rock.

Northwest Cove, within Horse Island, on the western side of St. Margaret Bay, is not a good anchorage. Care must be taken to avoid Horse Rock, small in extent, but with only 1¾ fathoms water on its shoalest part, which lies about 200 yards 273° from the northern point of Horse Island.

Mill Cove.—From Northwest Cove to Mill Cove the shores are bold, rugged, and free from danger, and may be approached in safety to 200 yards. From Mill Cove to Green Point, a distance of 2 miles, the shores of the bay are steep-to. The cove forms a convenient anchorage during westerly winds.

Hubbard Cove, at the extreme northwest corner of St. Margaret Bay, runs in for 1 mile to the northwestward and then takes a northeasterly trend to its head, where it receives the waters of a small lake.

Hubbard Cove Light, fixed red, elevated 60 feet above high water, visible 11 miles, is exhibited from a white square wooden tower, 42 feet in height, on Green Point, the southwestern side of the entrance to Hubbard Cove.

Slaunwhites (Slaugenwhites) Ledge, a ridge of rocks and sand extending in a northwesterly and southeasterly direction, lies on the eastern side of the entrance into Hubbard Cove. The actual rocky ledge is about 300 yards long, its highest rock on the southern end only just covering at high water; but it is surrounded by an extensive plateau of shoal ground nearly ½ mile in length, which terminates on its northern end in a small sandy knoll known as North Shoal, which dries 3 feet at low water and lies 800 yards from Red Bank Point in range with Black Point, bearing 66°.

A red bell buoy, with "Slaunwhites Ledge" in white letters, is moored 600 yards 160° from the large rock near the middle of Slaunwhites (Slaugenwhites) Ledge, and a red wooden spar buoy is moored off the northwestern end of the ledge.

Green Point Shoal, a small detached rocky patch covered with 3 fathoms, lies a short 400 yards 8° from the northern extremity of Green Point; the shoal has deep water around it, and may consequently be passed on either side.

Directions.—If from the southward, avoid bringing the tangent of Dauphneys Head to bear to the westward of 319°, which will clear Slaunwhites Ledge on its western side, keeping clear of the above-mentioned buoys, and when Red Bank Point bears 90° the vessel will be abreast Green Point Shoal, and from thence may steer up mid-channel, anchoring as convenient.

There is a passage 400 yards broad, available for small vessels, on the eastern side of Slaunwhites Ledge, but as there are no direct range marks bring the southern point of Dauphneys Head to bear 296°; steering on this course will lead through in 3¼ fathoms, then avoid Green Point Shoal, and after passing it select a berth as convenient.

Ingram River is nearly ½ mile across the entrance, from whence it runs northward 1¼ miles to its head, where it receives the waters of a fresh water river.

The western shore of this indentation is clear; on the eastern side, ½ mile from the head, is some shoal ground, which will be cleared on its western side by keeping Wood Island well open of East Head.

Ingramport is situated on the western side of the estuary of the Ingram River. It consists of a sawmill and a few huts for the workmen. There is a wharf for the shipment of lumber, capable of accommodating two vessels of from 4,000 to 5,000 tons. Vessels moor at the wharf with an anchor and 90 fathoms of chain laid out to the southward. The estuary is open to gales from the southward, but the place is considered a safe anchorage; no instance is recorded of a vessel breaking adrift or sustaining any damage.

Pilot.—Although the bay is perfectly safe and easy to enter in clear weather, the services of a reliable pilot are available. The pilot boards vessels in the stretch between Pearl Island and Shut In Island, according to the state of the weather.

Supplies.—Water may be obtained from a lake near Ingramport. Fresh provisions may be obtained here or ordered from Halifax.

Communications.—There is railroad communication with Halifax twice daily. There is also telephonic communication with Hubbard Cove. The nearest consular representatives are at Halifax.

Hospital.—The collection of a hospital fee of 1½ cents per net registered tonnage entitles seamen to medical attendance and to be received in the hospital at Halifax in case of necessity.

Croucher Shoal, about 200 yards in extent, is the only danger off the entrance to Ingram River; the least water is 3¼ fathoms, from whence Black and Snares points are in range, bearing 264°, and the western end of Croucher Island is in range with the eastern side of Davy Point bearing 132°. The channel between Croucher Shoal and Island is about 700 yards wide; the western side of the island, being steep-to, may be passed in safety at a distance of 200 yards. Vessels may pass eastward or westward of the shoal by bringing East or West Heads to bear 16° until Red Bank Point is in range with Black Point bearing 245°.

Head Harbor, at the northeastern angle of St. Margaret Bay, is alike capacious and secure, with a sufficient depth of water to accommodate vessels of the largest draft.

From between Indian Point and Croucher Island, which may be considered the entrance points of the harbor, the distance is ½ mile; within these points there are no detached dangers which would affect vessels of small draft, and but few to be avoided by large vessels.

Clam Island, which is only a little more than 200 yards in extent, has a very shoal spit extending 200 yards to the northeastward from it.

The channel.—The main channel into the harbor is to the southward of Croucher Island Group, but within on the northern side there is a narrow deep-water passage, 200 yards across, between the 5-fathom curve.

There is a deep-water channel on either side of Clam Island, but the one on the northwestern side, being the wider of the two, is to be preferred, more especially for large vessels.

Shoal.—There is a shoal with 5¾ fathoms, rock, 2 miles southwestward of Indian Point, in the approach to Head Harbor, which should be avoided by vessels of heavy draft.

Marsh Gutter Rock, with 3½ fathoms, situated 700 yards 272° from Clam Island, has deep water all around and lies 270 yards 109° from the nearest point of a narrow indentation called Marsh Gutter.

Sand Cove Shoal is a small detached rocky patch with 4¼ fathoms, and lies with the southern end of Wood Island apparently in range with Black Point and the Episcopal Church at Smelt Brook, bearing 355°.

The western tangents of Wedge Island and the inner (or eastern) lump of Indian Point in range, bearing 194°, leads eastward of this shoal and westward of a long spit, extending from Sand Cove in a northerly direction, with a depth of 3¾ fathoms near its extremity.

Strawberry Island Shoal, a detached rocky patch, with 4¾ fathoms, having deep water all around, is 250 yards from Strawberry Island in a southeasterly direction, and lies with Black Point and southern end of Wood Island in range bearing 267°, and East Head just open eastward of Strawberry Island, bearing 320°.

Croucher Island is the outermost and largest of three small islets, almost connected, which lie off the entrance of Head Harbor, occupying a space of about ½ mile, northeast and southwest.

The main channel into the harbor is to the southward of the group, but within on the northern side there is a narrow deep-water passage, 200 yards across, between the 5-fathom curve.

Off the southern end of Croucher Island a shoal spit extends nearly 300 yards, which is cleared on its southern side by keeping the extreme southern part of the outer portion of Indian Point in range with the south tangent of the inner or eastern lump, and on its eastern side a safe offing will be maintained by not shutting in the Episcopal Church at Smelt Brook with Strawberry Island.

A similar spit extends in a southerly direction from Strawberry Island and is cleared on its eastern side by keeping Potato Island open eastward of Strawberry Island.

Croucher Island Light, fixed white, elevated 90 feet above high water, visible 15 miles, is exhibited from a white square wooden lighthouse, 40 feet in height, on the summit of Croucher Island.

Directions.—Being abreast the northern end of Shut In Island, proceed to the northward until the eastern tangent of Clam Island is in range with the outer end of Indian Point, bearing 25°. The vessel will then be clear of Ringdove Shoal, and may steer 19°, rounding Indian Point at a distance of 400 yards, and after passing that point steer to the eastward, until the western tangents of Wedge Island and Indian Point are in range, bearing 187°.

Keeping the above marks in range astern will lead in mid-channel between Sand Cove Shoal and Strawberry Shoal; and when the northern end of Strawberry Island and Black Point are in range, bearing 261°, steer to pass to the westward of Clam Island, taking care not to shut in Croucher Island with the southern point of Strawberry Island, in order to avoid Marsh Gutter Rock, with a depth of 3½ fathoms.

A good mark for rounding the northeast spit of Clam Island, after passing Marsh Gutter Rock, is to bring Black Point, on the northern shore of St. Margaret Bay, midway between Potato Island and the mainland; anchor in 9 or 10 fathoms, mud, with the eastern end of Clam Island apparently in range with the outer end of Indian Point and Potato Island, its apparent breadth open southward of Black Point.

To pass eastward of Clam Island proceed on either side of Sand Cove Shoal with the marks already given, and when Black Point is seen open northward of Strawberry Island, bearing 259°, alter course so as to pass midway between Clam Island and the eastern shore, and anchor in the position already described.

French Village Harbor has its entrance between Indian Point on the north and Davy Point on the south and is ½ mile wide. Within Davy Point is an indentation, off which secure anchorage may be obtained in about 11 fathoms, mud.

From abreast the anchorage the village, upward of 1 mile in length, is scattered along the whole length of the southern shore.

Davy Rock, 400 yards in length, covered with 1½ fathoms on its shoalest spot, lies off the entrance of French Village Harbor, with Davy Point bearing 115° distant about 700 yards, and the outer end of Indian Point bearing 0°, nearly ½ mile. The deep water channel on the northern side of the shoal is narrowed to about ¼ mile by a spit which extends about the same distance to the southwest from Indian Point.

Harbor Spit.—A short distance eastward of Davy Point, which is steep-to, a spit extends a little more than 200 yards in a northerly direction; the high land of Aspotogan open northward of Davy Point, bearing 222°, leads northward, and the southwest end of Croucher Island in range with the southern part of Indian Point bearing 304° leads eastward, of Harbor Spit.

Ambrose Rock, small in extent, with 3½ fathoms on it and deep water around, lies 1,200 yards eastward of Davy Point and about 300 yards off the southern shore of the harbor abreast the church. It is beyond the range of the usual anchorage.

Directions—Inside channel.—From about ½ mile westward of the northern point of Shut In Island the western end of the eastern and larger lump of Indian Point should be open outside Wedge Island, bearing 14°. Steering with these marks in range will lead between Little Thrum Spit and Ringdove Shoal and when the green line of the northern end of Luke Island is just open southward of Little Thrum, bearing 129°, a vessel will be off the spit and should steer 26° for McDonald Point, which will lead through in the deep-water channel between Wedge Island and Haymans Point. When the latter point is in range with the stony tangent of Franks George Island, bearing 168°, alter course to 2°, when the vessel's head should be pointing toward the western edge of the inner and larger of the two lumps of Indian Point, bearing in mind that shoal water extends 300 yards in a southwesterly direction from McDonald Point.

Proceed on the above course until Church Point is in range with Davy Point, bearing 59°, and immediately alter course to 36° for the southern tangent of the peninsula, opposite Croucher Point, and as Croucher Island nears the outer tangent of Indian Point gradually steer to the eastward until these objects are in range, bearing 304°, and anchor in 11 fathoms, mud, with Church Point bearing 53°.

Outside Channel.—After passing Shut In Island at a safe distance, steer to pass westward of the red conical buoy marking Ringdove Shoal until Davy Point, bearing 48°, is well open northward of Wedge Island; then alter course midway between Davy Point and Davy Dock, and proceed to the anchorage as before directed.

Wedge Island, about 300 yards long and 30 feet high, lies about 1,400 yards northward of Franks George Island and ½ mile from the nearest shore.

From the southwestern end a shoal extends ¼ mile in a westerly direction, covered at its extremity by only about 1¾ fathoms of water. Another spit also projects from the island 250 yards in a northeasterly direction.

Ringdove (Middle) Shoal is ¼ mile long north and south; from the shoalest part, with a depth of about ¾ fathom, Wedge Island bears 31°, 1 mile.

Clearing marks.—The green line of the northern end of Luke Island open southward of Little Thrum Island, bearing 129°, leads southwestwardly; the highest part of Redman Hill open northward of Franks George Island, bearing 93°, leads northward; and the white gable of house open westward of Croucher Island bearing 6°, clears Ringdove Shoal.

Buoy.—A conical red buoy with "Ringdove Shoal" in white letters, is moored in 10 fathoms 400 yards 250° from Ringdove Shoal.

Little Thrum Island.—Southwestward of Franks George Island are two small islets, the smaller and outermost being Little Thrum Island, about 100 yards long; from it a shallow spit extends ¼ mile in a northwesterly direction. There is also shoal water on its southwestern side, which should not be approached within 400 yards.

The western tangent of the inner, or eastern, lump of Indian Point, just open westward of Wedge Island, clears the western side of Little Thrum Spit and leads about mid-channel between Franks George Island and Ringdove Shoal.

Long Cove is southeastward of Little Thrum Island. It can be entered by a channel ¼ mile broad northward of Troop Island, between it and Franks George Island; off the southern end of the latter island shoal water extends nearly 400 yards in a southerly direction. The northern point of Troop Island should be given a berth of 200 yards in rounding. The cove is connected with Luke Anchorage to the southward by a narrow channel eastward of Troop Island; in the middle of the southern entrance of this channel, between Troop and Grampus Islands, there is a small rise over which the depth is 3½ fathoms.

Luke Island.—This island, 40 feet high, is situated about 1¾ miles 32° from the northern point of Shut In Island. There is shoal water off the southwestern end of Luke Island, which should not be approached by vessels of large draft nearer than 400 yards. A patch of 4½ fathoms lies 400 yards southward of the southern point of the island, or midway between it and Paul Point on the mainland. The southeastern point of the island is a dry stony tongue, between the end of which and the main shore is about 600 yards; its northern end consists of a longer stony spit, only 400 yards from Troop Island to the northeastward, but with a deep passage between; the spits at both these points are steep-to.

Anchorage.—Within Luke Island there is excellent anchorage in about 8 fathoms, where vessels may remain in security during gales from any quarter.

The anchorage is very accessible; if from the southward avoid the shoal water off the southwestern end of the island, and in a vessel of deep draft the 4½-fathoms patch. When the eastern end of Troop Island opens eastward of the southeastern stony point, steer for the anchorage, from whence the northern end of Shut In Island is seen over the southeastern point of Luke Island, and Big Thrum Island appears midway between Troop Island and the northern stony tongue of Luke Island.

Shut In Island, the southern end of which is about 1 mile 358° from Paddy Head and ½ mile from the shore, is 1,400 yards in length in a northerly and southerly direction, and attains an elevation of 200 feet.

The eastern and western shores of Shut In Island are steep-to, but in rounding the northern point do not approach nearer than 300 yards; within the island the holding ground is good, and the place well sheltered, secure, and smooth during southerly gales.

Channel.—Although southward of Shut In Island there is a deep-water channel leading between the island and the mainland, there are numerous rocks which render this passage unadvisable without the assistance of local knowledge; the rocks referred to will be cleared to the westward by keeping Middle Point open of Paddy Head.

Indian Harbor, available for only small vessels, is formed between Paddy Head Island and the mainland. The entrance between the southern extremity of Paddy Head Island and Wreck Island is very narrow and lies about 1¼ miles southward of Shut In Island.

Indian Harbor Light, fixed white, elevated 36 feet above high water, visible 7 miles, is exhibited from a white square wooden tower, 33 feet in height, on the southeastern extremity of Paddy Head

Island, at the entrance to Indian Harbor, about 1 mile northward of Middle Point.

The light is intended as a guide to small vessels entering Indian Harbor between Paddy Head and Wreck Island.

Buoys.—Four spar buoys mark shoals in the channel leading from Wreck Island to the coves in Indian Harbor. Three of these buoys, painted red with conical topmarks, should be left on the starboard hand, and the fourth, painted black, on the port hand, when entering the harbor.

Crawford Ledge, which just shows at low water springs, lies at the outer end of a shallow tongue, extending 600 yards in a westerly direction from a point nearly ½ mile northward of Middle Point. The ledge, which is steep-to outside, lies nearly 400 yards within Middle Point Rock in the direction of Jacks Island.

Middle Point Rock, with 3¼ fathoms water, lies 306°, ½ mile from Middle Point.

Clearing marks.—The eastern side of Shut In Island, apparently just in range with Paddy Head, leads about 200 yards westward of Middle Point Rock.

Peggy and Middle Point in range 137° leads between Crawford Ledge and Middle Point Rock.

Bell buoy.—A red bell buoy, with "Crawford Ledge" in white letters, is moored in 12 fathoms ½ mile 261° from the western extremity of Crawford Ledge.

Peggy Point is the eastern entrance point of St. Margaret Bay; from it to Dover Castle the coast trends about 3 miles southeasterly, and in the stretch are many islands.

Peggy Point Light, occulting white, elevated 67 feet above high water, visible 13 miles, is exhibited from a white octagonal, reinforced-concrete tower, with sloping sides, surmounted by an octagonal iron lantern with red roof, the whole 44 feet high, erected 60 feet westward of the old lighthouse on Peggy Point.

Fog signal.—A hand fog horn is sounded in answer to vessels.

Halibut Rock is small and covers at the first quarter flood; it is surrounded by deep water and lies 200 yards off Peggy Point, about 1¼ miles 142° from Middle Point.

Clearing Mark.—Dover Castle seen open of Corny Rock leads southward, and Paddy Head in range with Middle Point leads westward of Halibut Rock.

There is a rocky patch with 7 fathoms over it 1¼ miles 280° from Peggy Point Light.

Tides.—High water interval at Shut In Island is 7h. 32m.; spring range 7.1 feet, mean range 5.8 feet. The rise and fall of the tides in St. Margaret Bay are regular, but the tidal currents are very weak, except at the entrance between Shut In Island and Peggy

Cove, on the eastern side, and from Owl Head to Southwest Island, on the western side; between these shores the current attains a velocity of about 1 knot per hour in the strength of the tide, the flood running to the northward and the ebb to the southward, but following the trend of the shores on either side when close in.

Directions.—From the southward or westward, and being outside Pearl Island, do not bring the northern point of Pearl Island to bear southward of 227° until the whole of Little Tancook Island is open northward of East Ironbound Island, in order to avoid Northeast Shoal.

To pass eastward of Horseshoe Ledge, bring Owl Head well open eastward of Southwest Island, bearing 329°; and to pass westward, Owl Head should be kept open westward of the small islets off the northern end of Southwest Island, bearing 354°; in this latter case, when the tangent of New Harbor Point bears 259° the vessel will be to the northward of Horseshoe Ledge, and a course may be steered for the southern end of Shut In Island, taking care to avoid Charley Rock on the eastern side of Southwest Island.

On approaching St. Margaret Bay from the eastward, and being clear of the dangers off the southwestern end of Betty Island, steer to the northwestward so as to pass at a safe distance outside Halibut Rock.

From an offing ½ mile westward of Halibut Rock steer 318° for a distance of 2 miles; thence proceed to any of the anchorages in accordance with previous directions.

Black Rock, which covers at high water springs, is the outer of the western dangers at the entrance to Port Dover, Blind Bay, and Shag Bay, and lies ¼ mile 109° from a remarkable bare rocky islet, 45 feet high, known as Dover Castle.

There is a narrow but deep water channel between it and the rocky islet, but care must be taken to avoid a ½-fathom patch which lies 100 yards from Black Rock in a northerly direction.

Shoal—Buoy.—A shoal, with a least depth of 2 fathoms over it, lies 400 yards 160° from Black Rock.

A black can buoy, marked "Black Rock Shoal" in white letters on top, is moored in 16 fathoms of water 150 yards 160° from the shoal.

Cabbage Garden Shoals consist of two rocky patches off the entrance to Port Dover; the outer, about 200 yards in extent, has a depth of about 1¾ fathoms, and lies 600 yards 73° from the southern point of Fleming Island.

The inner shoal, situated northwestward of the outer part, just uncovers at low-water springs, and lies 400 yards 43° from the southern point of Fleming Island.

The outer Cabbage Garden Shoal is marked on its southwestern side by a red spar buoy.

Leary Point Shoal.—The 1½-fathom shoal, about 1 mile northeastward of Dover Castle, and 200 yards southward of Leary Point, is marked by a black spar buoy.

Round Rock, covered with ¾ fathom, is steep-to all around; it lies 300 yards eastward of Leary Point.

It is marked by a black spar buoy on its eastern side.

Middle Ground, on the western side of the channel leading into Blind Bay, is about 200 yards in diameter, with two rocky rises 100 yards from each other northward and southward; the northern point is just awash at low-water springs, the other then is covered with ½ fathom. The western extremity of Doyle and eastern extremity of Myras Islands (within Blind Bay), apparently in range with and bearing 7°, lead eastward of Middle Ground and Round Rock.

Port Dover Light, fixed white, elevated 50 feet above high water, visible 12 miles, is exhibited from a white square wooden tower, 31 feet in height, with a red lantern, on the southern end of Callaghan Island, Port Dover.

Buoys.—Black spar buoys are moored off the southeastern end and off the northeastern end of Callaghan Island. A similar buoy marks the southeastern end of Bowman Reef.

Coyle Cove.—The dangers in and in the approach to Coyle Cove are marked by spar buoys.

Tides.—High water interval in Blind Bay is at 7h. 30m.; spring range 7½ feet, mean range 6.1 feet.

Directions—Port Dover.—As Black Rock only just covers at high water springs, it is very seldom that its position can not be identified, but on such exceptional occasions to pass eastward of the rock and the black buoy marking the 2-fathom shoal, bring the eastern tangents of Myras and White islands apparently in range, bearing 15°, until Soi Point (having houses on it) opens eastward of Fleming Island, bearing 309°, when proceed in that direction, and on nearing Fleming Island alter course so as to pass between it and Cabbage Garden Shoals.

The anchorage is in a depth of 9 or 10 fathoms, mud, with Fleming Ledge in range with the southern end of White Island and the eastern end of Dover Castle in range with the western end of Fleming Island.

Leary Point, midway between the high water lines of High and White islands, bearing 36°, leads through in deep water between Dover Castle and Black Rock, as does also Fleming Ledge, seen just open of Fleming Island bearing 351°.

Blind Bay.—Blind Bay affords good anchorage northward of Myras Dry Ledge. Proceeding through the main channel between Black Rock and Shag Bay Breakers, with the two Gull Rocks in range, alter course when necessary so as to pass between Outer Gull Rock and White Island, or steer 2° for Doyle Island; it will then appear about midway between Black Point and Myras Island. Avoid going to the westward of the range where Doyle and Myras islands appear in range in order to keep clear of Round Rock and Middle Ground.

If the draft of water renders it necessary to avoid a 4-fathom patch, about 270 yards off the northeastern point of Myras Island in an 31° direction, steer toward the eastern shore, with Leary Point and the northwestern end of White Island just open of each other until Myras Dry Ledge is in range with the southern tangent of Clarke Island; then steer around Myras Dry Ledge, keeping an offing of 200 yards off its eastern end, and anchor in about 6 fathoms, mud, in a berth equidistant from the ledge, Clarke Island, and rock southward of Flat Island.

Shag Bay.—Shag Head forms the eastern entrance point common to Shag and Blind bays. Shag Bay is a narrow arm of the sea, 3½ miles in length, with a general trend to the northeastward and has a good anchorage off a small cove near its head on the western shore.

Buoys.—Three red and one black wooden spar buoys mark the channel southeastward of Redmond Island, leading to the Government Wharf on the eastern side of the bay.

There are two red and two black wooden spar buoys westward of Redmond Island.

Shag Bay Breakers consist of a rocky ridge about 700 yards in length northeastward and southwestward, with a depth of about ¾ fathom at the northern extremity and ¼ fathom at the southern.

Port Dover Light, bearing 321°, leads westward of Shag Bay Breakers.

Bell buoy.—A red bell buoy, with "SHAG BAY BREAKERS" in white letters, is moored in 22 fathoms ¼ mile 205° from the southwestern extremity of the shoal.

Green Shoal, with fathom water and about 250 yards in length, lies 1,200 yards 200° from Shag Head, with a deep-water channel, 400 yards in width, between it and Shag Bay Breakers.

Clearing mark.—Inner Gull Rock in range with Shag Head, bearing 5°, leads eastward; Faders Head, seen open westward of Outer Gull Rock, bearing 28°, leads westward; Faders Head, just in sight eastward of Inner Gull Rock, bearing 20°, leads between, and Norris Bald Rock, in range with the northern tangent of Betty

Island, bearing 104°, leads nearly 700 yards southward of Shag Bay Breakers and ½ mile southward of Green Shoal.

Gull Shoal, small in extent, with 1 fathom water, is nearly equidistant from the Outer and Inner Gull Rocks and main shore, the passage between it and the latter being 350 yards across. From Gull Shoal, Faders Head is hidden by Inner Gull Rock, and the southern point of Dover Castle is seen just open of the northern high water mark of Outer Gull Rock.

Buoy.—Gull Shoal is marked by a black spar buoy.

Frying Pan Rock, which covers during last quarter flood is the highest part of a shoal about 200 yards in extent, and bears from Black Point Ledge (which is 3 feet above high water) 135 about 200 yards. From Frying Pan Rock the southeastern end o White Island and the northern point of Dover Castle are appantly in range, bearing about 241°.

The navigable channel on the eastern side of Frying Pa Rock is about 200 yards in width.

The shoal is marked by a black spar buoy.

Directions—West Channel.—A good range mark, vstward of Shag Bay Breakers, is the two Gull Rocks in range, bearig 39°. On passing Outer Gull Rock keep a good 200 yards off, espeally on the northern side, after which close Inner Gull to within 20yards, so as to pass midway between Inner Gull and Frying Pan Ro, and thence proceed up the bay and anchor in about 8 fathoms, ml, off Northwest Cove, with Faders Head bearing about 180°.

East Channel.—If from the eastward, after havg cleared the shoals off the southwestern end of Betty Island, ste to the northwestward until Black Point is seen just open of ShaHead, bearing 341°; this mark leads eastward of Kitiwiti and een shoals and toward Shag Head, which may be rounded close. Immediately after passing the head close the eastern shore, uil Faders Head opens well out eastward of Inner Gull Rock, bearg 19°; this mark will lead on the eastern side of Gull Shoal, aftewhich proceed up the bay and anchor as before directed.

Kitiwiti Shoal, about 300 yards in extenon which the sea breaks during bad weather, is composed of ro the shoalest part, with a depth of 5 fathoms, lies about ¾ mile 2 from Norris Bald Rock.

Clearing mark.—Norris Bald Rock in nge with Breakfast Island leads northward; and the same rock inge with the northern extremity of Herons Island leads southw of Kitiwiti Shoal.

Prospect Harbor, at the mouth of an aof the sea, upward of 3 miles in length, known as Prospect Riv is distant from Mars Head about 2½ miles in a northwesterly diion.

The anchorage is within Herons Island, on the eastern shore of the river, where large vessels may find good shelter, and although there are dangers off the harbor, they are such as can easily be avoided when once the islands marking the approaches thereto have been identified.

The town of Prospect is built, in a somewhat straggling manner, on the narrow western point of Prospect River.

The principal import is flour and the only export fish.

Landmark.—The Roman Catholic Church, a conspicuous object, can be seen from a long distance at sea.

Betty Island.—The southern point of this island, named Brig Point, lies 1¾ miles 275° from the nearest point of Mars Head, and from thence its length is about 1,750 yards in a northerly direction. A bank on which the soundings are shoal and irregular, and on which Duck and Hopson islands, with numerous other off-lying rocks are situated, extends nearly 1 mile northwestward from the island.

Betty Island Light, revolving red, elevated 75 feet above high water, visible 14 miles, is exhibited from a square lighthouse, 54 feet in height, painted white, with two horizontal red bands, erected on Brig Point, the southern end of Betty Island.

Fog signal.—A hand horn answers vessels' signals.

Southwest and Devereux shoals are both isolated rocky patches lying off the southwestern end of Betty Island. Southwest Shoal, covered with only 1½ fathoms, is nearly ¼ mile offshore. Devereux Shoal, with 3¼ fathoms, lies nearly 200 yards farther out.

A rocky shoal, with a depth of 5½ fathoms, which breaks in a heavy sea, lies about 1,400 yards 162° from Betty Island Lighthouse.

White Horse Rock, with only 1¼ fathoms water, lies between Hopson Island, 83 feet high, and Norris Bald Rock, 20 feet high; from the latter it bears 124°, about ¼ mile. From White Horse Rock the southern point of Breakfast Island is in range with the northern point of Shannon Bald Rock.

Heron Rock, small, detached, and showing at low water, is steep-to on its eastern side and lies about 100 yards in an easterly direction from the northeastern end of Herons Island, there being a depth of 3 fathoms in the passage between. As this rock is in close proximity to the anchorage, care must be taken to give it a clear birth when anchoring. From the rock Burnt and Shannon Islands are nearly in range.

Southeast Shoal, southeastward of Betty Island, is nearly 200 yards in extent, with a depth of 2¾ fathoms, and breaks during an ordinary southerly gale. From the eastern end of the shoal Dollar Rock is in range with the eastern end of Poors Island, and the eastern tangents of Betty and Burnt islands are in range.

Clearing mark.—There is a deep-water channel on either side of this danger, the clearing marks westward of the shoal, at 200 yards, being Betty and Shannon islands, apparently in range, bearing 8°, while Betty and Herons islands, apparently in range, 332°, not only leads eastward of this danger but leads westward of all the rocky dangers off Mars Head.

Dollar Rock, at the entrance of Back Bay, covers at ¾ flood, but the position may nearly always be known by a break; this rock serves the useful purpose of being a good mark for the avoidance of sunken dangers. From the center of Dollar Rock, Breakfast Island is just open northward of the high water tangent of Betty Island, bearing 292°, and the eastern point of Shannon Island is seen just open eastward of Shannon Bald Rock.

Detached shoals.—There are two isolated patches covered by 3¼ and 3¾ fathoms, which, lie, respectively, 400 yards 312° and 200 yards 289° from Dollar Rock; while farther northward, about midway between Shannon Bald Rock and the northeastern end of Betty Island, is a shoal with only ½ fathom water on it, which narrows the channel on its western side to about 400 yards. This channel is also obstructed by a patch of 3 fathoms, situated 600 yards 309° from the ½-fathom patch and 5° 400 yards from the northeastern end of Betty Island.

Tides.—High water interval at Prospect Harbor is 7h. 32m.; mean range 6.1 feet, spring range 7½ feet.

Along this coast time of high water is influenced by winds, especially if during a rotary gale a shift of wind occurs before high water. At the commencement of a southeastward gale there is a tendency to retard the time of high water, and this effect continues until the gale has reached its full height; but as the wind diminishes in force this principle ceases and a contrary effect ensues. In extreme cases the time of high water will be found to differ fully an hour from undisturbed periods.

Directions—Western channel.—If from the eastward, avoid shutting in Shannon Bald Rock with the southern point of Betty Island until Norris Bald Rock is in range with the high-water rock westward of Hopson Island, bearing 336°; this latter mark will clear Devereaux Shoal on the western side, after which bring Norris Bald Rock to bear 351° and proceed on that course, rounding the rock on the northern side, which is steep-to.

Then steer 73° for the highest part of Herons Island, taking care not to approach the high water line of Saul and Church points within 200 yards. When the spire of Prospect Church is in range with Church Point, alter course to round Herons Island, taking care to keep Saul Point well open of Herons Island until Burnt and Shannon islands are seen open of each other, in order to avoid Heron Rock;

thence steer for the anchorage in 7 to 9 fathoms, mud, with Prospect Roman Catholic Church in range with the northern end of Herons Island and midway between that island and the main shore.

Eastern channel.—Although the eastern passage into Prospect Harbor is alike narrow and intricate when compared with the western channel, circumstances may necessitate vessels using it, and therefore the following directions are given; but the western channel should invariably be taken under ordinary circumstances:

If from the eastward do not approach Mars Head nearer than ½ mile, in order to avoid The Grampus and other shoals; and when Betty and Herons islands are apparently in range, bearing 332°, proceed on this mark until approaching the eastern point of Betty Island, which, being steep-to, may be rounded within the distance of 200 yards.

After passing the point steer to the northwestward with the spire of the Roman Catholic Church at Prospect in range with the southwestern end of Bald Rock, and after rounding the latter on the northern side bring Dover Castle to apparently in range with Saul Point; these marks will lead between groups of rocks, some of which are only covered at high water.

Keeping a mid-channel course between Church Point and Herons Island, round the northern point of the latter and proceed to the anchorage as before directed.

There is another passage to the anchorage eastward of Burnt Island, which might be used by small vessels, but should not be attempted without local knowledge, as the deep-water channel eastward of Herons Island is very narrow and circuitous.

Back Bay.—A mile from Mars Head, in a northwesterly direction, is the entrance to Back Bay, which is rendered unserviceable as an anchorage in consequence of numerous dangers across its entrance, in addition to which the space of available deep water is not only exposed to the southwest, but is very limited in extent.

The Grampus, with only 1¼ fathoms water, is the outer of several rocky patches extending from Mars Head to the southwestward. It lies nearly 800 yards 185° from the western tangent of the head and about the same distance from the nearest shore. From it Shannon and Burnt islands are just apparently in range, bearing 327°, and are in range with Dollar Rock.

A black bell buoy, with "Grampus" in white letters, is moored 400 yards 159° from Grampus Rock for the benefit of vessels bound into Terence Bay.

Terence Bay, about 2 miles within Mars Head, and at the northwestern angle of Pennant Bay, is open to the south-southeastward.

Shipley Head Light, fixed red, elevated 57 feet above high water, visible 8 miles, is exhibited from a white square wooden tower, 32 feet in height, with sloping sides and surmounted by a square wooden lantern; erected on Shipley Head.

The anchorage is good in a depth of 8 or 9 fathoms, mud, midway between Cat Island and the western shore, with Church and Tenant Points in range.

Directions.—To enter Terence Bay by the western passage steer to pass midway between Broad Rock, which covers at high water, and Puffer Shoal, on which the sea is said always to break, by bearings of Terence Rock. Pass westward of Terence Rock, between it and Black Shoal, keeping nearer to the former, which is quite bold on that side; from thence gradually steer to the northward, until the southern extremities of Seven Islands and Pennant Island are in range, in order to avoid the 2-fathom shoal which lies 400 yards from Tenant Point. With the above marks in range the vessel may steer to the northwestward toward the anchorage.

If the eastern passage (which is preferable for sailing vessels in some winds) be taken, stand in for the western end of Mackerel Island, bearing not to the eastward of 7°, until Church Point is in range with the northeast side of Terence Rock, bearing 310°; then alter course and steer with those marks in range until the rock is approached, when sheer gradually to the northward, so as to pass at the distance of 200 yards northeastward of it, and thence to the northwestward for the anchorage.

Pennant Bay lies between Mars Head and Pennant Point. the former being a rocky peninsula 75 feet high. The bay is 3 miles broad between the entrance points and about 2 miles deep; it is thickly studded with rocky shoals and islands, but affords shelter to those acquainted with the passages between them. The land at the head of the bay is moderately high; Hospital Hill, the most elevated part, is 250 feet high.

Pennant Point is the extremity of a peninsula about 100 feet high and 1 mile in width, which projects out southwestward for 3 miles beyond Pennant Bay and Sambro Harbor.

Broad Shoal surrounds Pennant Point to the distance of 400 yards.

Whistle Buoy.—A black conical whistle buoy, with "Pennant" in white letters, is moored in 18 fathoms off Pennant Point, with the extremity of that point bearing 22° about 1¾ miles.

Pennant Harbor, at the northeastern angle of Pennant Bay. though small in extent, has secure anchorage within several small islands; but care is necessary to avoid a dangerous rocky patch known as Middle Ground, covered by 2 fathoms water, which lies in the fairway of what is termed the good channel between Pennant Point and Island.

Pennant Harbor Light, fixed white, elevated 37 feet above high water, visible 7 miles, is exhibited from a white square wooden tower, 33 feet in height, situated on a point on the northern side of the entrance to Pennant Cove. The light is intended for the benefit of fishermen frequenting the harbor.

The anchorage is from 100 to 500 yards eastward of Martin and Saddle islands, in a depth of 6 to 7 fathoms, mud.

A black wooden spar buoy is moored southward of Martin Island to mark Stapleton Rock.

Directions.—When rounding Pennant Point be careful to avoid Broad Shoal, which extends 400 yards off it to the southward and westward. Hospital Hill, in range with the 90-foot western shoulder of Pennant Island bearing 351°, leads about 600 yards westward, well clear of this danger.

After passing 200 yards to the eastward of Bald Rock, steer northeastward for Thrumcap Island until the Seven Islands are seen open northward of Pennant Island, when the Middle Ground will be passed; then round to the eastward and northward of Thrumcap Island at the distance of 200 yards, and pass between it and the rocky 3-fathom shoal lying 500 yards northeastward from it. Having passed to the westward of this shoal, anchor eastward of Martin and Saddle Islands.

CHAPTER V.

NOVA SCOTIA—SOUTHEAST COAST—SAMBRO HARBOR TO CAPE CANSO.

Sambro Harbor, lying at the head of the bay formed between Pennant Point on the west and Cape Sambro on the east, has anchorage within the Isle of Man. The heavy sea during southwesterly winds is much broken by the ledges outside; but the shelter is imperfect, and the dangers off and in this harbor are so numerous that it should never be attempted by large vessels, excepting in a case of extreme necessity.

Inner Sambro Island Light, fixed white, elevated 45 feet above high water, visible 8 miles, is exhibited from a white mast 17 feet in height, with a white shed at its base, erected on the western point of Inner Sambro Island.

Sambro Harbor Light, fixed red, elevated 38 feet above high water, visible 7 miles, is shown from a white square wooden lighthouse with sloping sides, 33 feet in height, erected on Bull Point, southwestern side of the entrance to Sambro Harbor.

Anchorage.—The anchorage is within the Isle of Man and Black Reef, from 100 to 400 yards from them, in a depth of 6 or 7 fathoms, over mud bottom.

Farther in there are several secure anchoring places for small vessels, as the Mud Hole, the Basin, etc.; but the rocks are too numerous for a large vessel to venture among them with safety.

Buoys.—A black wooden spar buoy marks the extremity of the shoal extending off from the southern end of Round Island.

A red wooden spar buoy marks the western edge of Hen and Chickens Shoal.

A black wooden spar buoy marks Lawn Rock.

A red wooden spar buoy marks a shoal 320 feet southeastward of the outer end of the Neville Packing Co.'s wharf at Sambro.

Directions—From the westward.—To enter Sambro Harbor from the westward, bring the highest hill on Cape Sambro over the western rise of Inner Sambro Island, and with these marks in range proceed between Pennant Point and Bull Rock. After passing to the westward of the latter at a distance of 300 or 400 yards, to clear the shoal water off it to the northward steer 39° or with the eastern ends of Round Island and Isle of Man in range, if these tangents can be distinguished; if not, pass 300 yards eastward of Island Rock, and continue to steer 39° until Fairweather Rock is seen open southward of Inner Sambro Island, which will clear Torpey Ledge.

Then to avoid Middle Ground steer more easterly, so as to pass not more than 200 yards to the northward of the western end of Inner Sambro Island, which is quite bold. When the marks for clearing Cowley Rock, which has about 1¾ fathoms over it and seldom breaks, come in range, viz, Fairweather Rock apparently in range with the western point of Inner Sambro Island, bearing 200°, steer 19°, and having passed this danger steer to the northward and eastward of Isle of Man and anchor within it and Black Reef, as before directed.

From the southward.—Having Chebucto Head well open to the eastward of Sambro Island, to insure being outside the Southwestern Breaker, which, however, can generally be seen, and is also marked by a black buoy, steer to pass midway between Southwest Breaker and Pennel Shoal by bearings of Inner Sambro Island Lighthouse.

Having passed these dangers, proceed toward the lighthouse, taking care to avoid two 4-fathom patches 1 mile and ½ mile, respectively, southward of the lighthouse, until nearly abreast Fairweather Rock; then steer to pass midway between that rock and the western end of Inner Sambro Island and round the latter to the northeastward, thence proceed as before directed.

From the eastward.—If from the eastward, and intending to pass between or within Sambro Ledges or on either side of Inner Sambro Island, the aid of the chart and a local pilot acquainted with all the dangers is indispensable.

Buoys.—Sambro Channel, inside of Sambro Island, and used extensively by small vessels, is marked by the following buoys, red on the starboard hand when bound to the eastward and black on the port hand:

A black spar on the southern edge of Paddle Rock.

A black spar on the southern edge of Bigfish Shoal.

A red spar with a conical topmark, on the western edge of Wippy Rock.

A red spar with a conical topmark, on the northwestern side of Whale Tail, a little to the westward of Whaleback.

A red spar with a conical topmark on the western edge of Pollock Shoal and a similar buoy on the eastern edge.

A black spar on the southeastern edge of Stapleton Rock.

A black spar on the eastern edge of the shoal extending from Morris Point.

Sambro Ledges.—Smithson Rock, the outermost of the western ledges, with only 2 fathoms over it, lies 2.5 miles 228° from Sambro Island Lighthouse and 2.3 miles 129° from Pennant Point. From the rock, Fairweather Rock in range with the Isle of Man bears 8°.

Gull Rock, little more than its own breadth open of Ketch Harbor Head, bearing 37°, also leads over this dangerous rock, as well as over Mare Rock, which, with 1 fathom of water, lies nearly ¾ mile farther in.

The western end of Pennant Island, just open of Pennant Point, bearing 327° leads about 1,400 yards westward of Smithson Rock.

Southwest Breaker, which almost always shows, lies 1.3 miles 76° from Smithson Rock, and from it Chebucto Head is seen over the eastern extremity of Sambro Island, the latter bearing 26° about 1.4 miles.

Buoy.—A black can buoy, with staff and vane, and marked "SW. BREAKER," is moored in 12 fathoms, nearly 400 yards southward of Southwest Breaker.

The Sisters, the outermost of the eastern Sambro Ledges, lie 1½ miles northeastward of Sambro Island Lighthouse. Their position is pointed out by Black Rock, 15 feet high, from which they are about 700 yards 104°. Several rocks of this cluster uncover at low water and their position can always be seen; but Blind Sister is more dangerous, having a depth of 1½ fathoms over it at low water. Black Rock bears from it 332° ½ mile, and Broad Breaker, which almost always shows, bears 256°, 800 yards.

Ketch Harbor Lighthouse, open of Splitnose Point, bearing 331°, leads about 400 yards eastward of The Sisters up to the entrance of Ketch Harbor.

Blind Sister Shoal Bell Buoy, painted black, is moored in 22 fathoms water, about 700 yards 104° from the shoal.

Caution.—In approaching Halifax Harbor from the eastward, care must be taken to make allowance for a set to the westward toward the Sisters Rocks.

Ede Rock, with 1½ fathoms water on it, lies nearly midway between The Sisters and Morris Point, on the western side of the entrance to Ketch Harbor.

Outer Bank, Barse Ground, Shoal Ground, and Hennesy Bank are rocky fishing grounds with depths varying from 8 to 20 fathoms and should be avoided by vessels during bad weather, as they cause a heavy half-breaking sea.

Outer Bank, with 14 fathoms, is about 4¾ miles southeastward of Sambro Island Lighthouse. Sambro Bank continues about 2 miles beyond Outer Bank to the depth of 30 fathoms, terminating in a point from which the lighthouse bears 343°, 6.7 miles.

Barse Ground Rock, with 9 fathoms over it, lies 2.2 miles 174° from Sambro Island Lighthouse. Shoal Ground, with a least depth of 8 fathoms, is 2 miles 131° from the lighthouse.

Hennesy Bank, a small rock with 8 fathoms over it, lies ¾ mile to the southward of the Blind Sister and 1.7 miles 107° from Sambro Island Lighthouse.

Sambro Light and Whistle Buoy.—A black cylindrical buoy, marked "Sambro" in white, surmounted by a pyramidal frame supporting a whistle and lantern, from which an occulting white light is exhibited, is moored about 6 miles 156° from Sambro Island Light.

Submarine bell buoy.—A buoy, fitted with a submarine bell and with lattice superstructure, is moored about 300 yards northward of Sambro light and whistle buoy.

The bell is worked in an irregular manner by the motion of the buoy on the waves.

Sambro Lightship.—During the winter months the Sambro light and whistle buoy is replaced by a steam light vessel with two masts and no bowsprit, which is painted red. The gallery under each lantern, the funnel, and the foghorn are also painted red.

Two occulting white electric lights are exhibited at an elevation of 60 feet, one at each masthead, visible 13 miles.

Should the electric light fail a fixed white light of less power is exhibited from each masthead.

Fog signal.—In thick or foggy weather a foghorn, worked by compressed air, is sounded.

Should the horn be disabled a similar signal will be made by the whistle; should both be disabled a bell will be rung by hand.

Submarine bell.—A submarine bell is attached to the light vessel.

Clearing marks.—Sandwich Point in range with Chebucto Head, bearing 348°, will lead 1 mile eastward of Sambro Ledges. By night Mouger Beach Light, just open eastward of Chebucto Head, bearing 354°, will clear all the Sambro Ledges as well as Bell Rock and Duncan Reef.

The lead will give little or no warning when approaching these ledges from the eastward, on which side the bank is very steep, the depth being 45 fathoms within less than ½ mile from The Sisters.

Sambro Island Light, flashing white, elevated 140 feet above high water, and visible 17 miles, is exhibited from an octagonal stone tower, 82 feet high, painted white, with three red horizontal bands, surmounted by a red lantern, erected near the center of Sambro Island about 4¼ miles 204° from Chebucto Head.

Fog signal.—During thick or foggy weather an explosive fog signal gives reports from the seaward side of the lighthouse.

It occasionally happens that the weather is clear in the vicinity of the lighthouse, although very thick a few miles without.

Caution.—Experience has shown that the sound signals given from Sambro Island are very unreliable, so that it is unadvisable to make

Sambro in a fog. On no account should the use of the lead be neglected.

Telephone cable.—The light station on Sambro Island has been connected by telephone cable with Chebucto Head Light Station and thence with Halifax.

No arrangements have been made for commercial service, the connection being primarily intended to insure prompt communication in the event of a vessel being in distress.

Ketch Harbor is a narrow arm of the sea nearly 1 mile in length. The entrance lies 1.7 miles southwestward of Chebucto Head and the same distance northward of the Sisters Ledge. There is a depth of 1½ fathoms on its bar, with 3 fathoms mud, within, where its shores are occupied by the houses and stages of fishermen. At the head of the harbor is a chapel, as well as a fine stream, the outlet of the waters of several small lakes which lie about 1 mile to the northward.

Ketch Harbor Light, fixed red, elevated 46 feet above high water, visible 7 miles, is exhibited from a white square wooden tower, 32 feet in height, on the western side of the entrance to Ketch Harbor.

Bell Rock, covered with only 1 fathom water, lies 1,200 yards eastward of Ketch Harbor Head and 800 yards offshore. There is a rock with 4½ fathoms on it 200 yards northwestward from Bell Rock.

Buoy.—A black spar buoy is moored in 18 fathoms about 300 yards southeastward of Bell Rock.

Duncan Cove, on the southwestern side of Chebucto Head, affords shelter for boats.

Lifeboat.—A lifeboat is stationed in Duncan Cove; also a Lyle gun and life-saving apparatus.

Duck and Duncan Reefs.—Duck Reef extends 300 yards from the shore abreast Bell Rock; the channel between them is reduced to 300 yards, and Duncan Reef, 500 yards northward, projects 400 yards.

There is a passage between the above and Bell Rock, but it can not be recommended.

Buoy.—A black spar buoy is moored about 200 yards southeastward of Duncan Reef.

Chebucto Head, 5.4 miles 209° from Devil Island Eastern Lighthouse, and 4.4 miles 25° from Sambro Island Lighthouse, is the southern extremity of the western shore of Halifax Harbor. It is 106 feet high, and consists of a whitish granite, of which, together with clay slate, the steep and barren western shore of the harbor is composed.

Chebucto Head Light, fixed and group flashing white, elevated 132 feet above high water, visible 18 miles, is exhibited from a white square wooden tower, 22 feet in height, on Chebucto Head.

Fog signal.—A diaphone horn, operated by compressed air, is sounded from a building situated on the extremity of the head below the lighthouse. The building is of red brick with a slate roof.

Pilots.—There is a pilot station at the lighthouse. The pilots cruise in schooners outside of Chebucto Head.

HALIFAX.

Halifax Harbor, possessing an area of about 10 square miles, is open at all seasons, and its navigation is scarcely ever interrupted by ice. It is one of the finest and safest harbors in the world, affording space and depth of water sufficient for a large number of vessels; and although the dangers off its entrance are such as to render great caution necessary, especially during the fogs which usually accompany all winds from the sea, it is easier of ingress and egress than any other large harbor on the coast. The entrance, 5½ miles wide, lies between Devil Island, to the northeastward and Chebucto Head, to the southwestward; and from mid-position between these points the general trend of the harbor is in a northwesterly direction for a distance of 13½ miles, to the head of Bedford Basin.

The harbor is about 1,400 to 1,600 yards broad, but at the Narrows, about 1 mile above the upper end of the city, it contracts to less than 500 yards, and then expands into Bedford Basin, which has an area of 10 square miles, and is completely landlocked. On the eastern side of the harbor, and immediately opposite the Naval Yard, is the town of Dartmouth, with a population of about 6,000; steamers ply continually between the two places. Fort Clarence, with its tower, stands close to the shore, 2 miles farther to the southward, on the eastern side of the harbor.

It is also the chief rendezvous for British naval vessels on the North American Station, and its selection as a port of call for the mail steamers to and from England has increased its importance as a maritime city and advanced its commercial prosperity.

The city of Halifax is the capital of the Province of Nova Scotia, and contained in 1909 about 50,000 persons; it is built on the declivity of a peninsula on the western side of the harbor, and 8 miles within its entrance. The streets are lighted with electric light and gas. It contains 42 churches, Dalhousie University, a Presbyterian college, ladies' college, schools and academies, public halls, courthouse, jails, opera house, hospitals and asylums, etc.

The citadel, immediately in rear of the city, and in a central position between its two extremities, stands on a commanding elevation 285 feet above high water, and, with its flagstaff, forms a range mark easily recognized from a vessel off the entrance to the harbor.

Communication.—The mails, to and from Great Britain and Canada, are landed and shipped at Halifax, while the Gulf of St. Lawrence is closed to navigation. There is direct steamer communication between Halifax and the United States, Great Britain, Newfoundland, Bermuda, and the West Indies, all the year round. It is also a winter port for steamers running between Canada and South Africa.

Railroads.—Halifax is the terminus of the Intercolonial Railway, which affords communication with all parts of Canada, via Quebec; and the United States, via St. John, New Brunswick; it is 24 hours by rail to Montreal and Boston, 36 hours to New York, and 48 hours to Chicago. There is also railroad communication with Windsor, Annapolis, and Yarmouth toward the west, continued round the coast to Shelburne, Liverpool, and Lunenburg, to Halifax. Halifax is also united by railroad with Pictou, Port Mulgrave, and Pugwash, on the northeastern coast of Nova Scotia; and with Port Mulgrave, and Sydney, C. B., on the eastern side of the Province.

Telegraph.—Halifax is in telegraphic communication with all parts of Canada, the British Isles, Bermuda, Jamaica, and Colon by submarine cable, and with the United States by cable and land lines.

Industries.—The city has about 70 factories, including iron foundries, breweries, distilleries, sugar refining, machinery, agricultural implements, etc., the chief shipments being fish, lumber, grain, vegetables, and the products of the factories.

Coal and supplies.—About 14,000 tons of coal are usually kept in stock, and about 100,000 tons are imported annually, besides which about 3,000 tons are received daily from the Canadian mines.

Vessels are coaled rapidly, without interruption by weather, either alongside wharves, or by lighters of about 300 to 600 tons. About 500 to 1,000 tons can be placed on board in 24 hours.

The Halifax Tramway Co. and the Dominion Coal Co. own wharves which, together, hold 7,000 tons of coal.

A vessel going alongside dockyard wharf No. 4 should do so with her head to the southward, to avoid the 3-fathom shoal extending from the southern part of the wharf. The tidal current is reported to set up the harbor continuously.

Supplies of all kinds can be readily obtained; there is a commissariat contract for provisions, and a navy contract for vegetables.

There is one cold store which will contain 1,000 tons.

There is a grain elevator with a capacity of 500,000 bushels.

Storm signals.—Storm signals are hoisted at Halifax.

Time signal.—A time ball, electrically connected with the observatory of St. John, New Brunswick, is dropped from a small flagstaff at a short distance northwestward of the storm-signal station in the Citadel at Halifax. The ball is hoisted at the dip at 0h. 45m. p. m., close up at 0h. 59m. p. m., and dropped at 1h. 0m. 0s. p. m., Standard time of the 60th meridian of west longitude, or 0h. 45m. 40.7s. p. m. local mean time, corresponding to 5h. 0m. 0s. p. m. Greenwich mean time. This signal is made daily with the exception of Sundays.

The dockyard under the Marine and Fisheries Department is 2,700 feet in length, with a depth of from 12½ to 36 feet alongside. It has cranes lifting from 2 to 15 tons.

No. 4 Wharf is about 200 feet long and has a 3-fathom shoal extending from its southern part. There are securing chains attached to moorings for keeping vessels clear of the wharf.

Repairs.—The sheers belonging to the firm of Messrs. Patterson & Co. will lift 30 tons.

The graving dock, belonging to the Halifax Graving Co., is situated on the western shore of Halifax Harbor, about ¼ mile to the northward of the navy yard, has a frontage of 825 feet, with three wharves used as quays and three sheds, with an area of 21,552 feet; the depth of water at these quays is from 36 to 51 feet at low tide. The graving dock has a length for docking of 570 feet, breadth 85 feet, with a depth of 30 feet on the sill, at high water, and it is equipped with ample plant of a modern description for executing large repairs to steamers. The British Admiralty have the right of priority for use of this dock. (The plant was destroyed in December, 1917.)

Several marine slips are located at Dartmouth opposite Halifax in the harbor. No. 1 will take up 3,000 tons; No. 2, a vessel of 1,000 tons; No. 3, a vessel of 400 tons; and No. 4, a vessel of 200 tons.

Pilots.—Pilots for Halifax Harbor may be obtained from one of the schooners which cruise off Chebucto Head a few miles apart and within a radius of 15 miles from it.

The pilot schooners carry a flag with two horizontal red and white bands, and unless met with at sea, vessels approaching Halifax Harbor requiring a pilot should hoist their colors by day and at night or during foggy weather a gun should be fired.

Hospital.—Seamen are received into the Victoria General Hospital for medical treatment.

Depths.—In the entrance northeastward of Rock Head Shoal there are depths of 7 to 8 fathoms; between Rock Head and Portuguese Shoals, 6 fathoms; westward of Portuguese Shoal, 19 fathoms; eastward of Neverfail Shoal, 7 to 8 fathoms. The remaining depths in the channel to the city are over 10 fathoms.

Anchorage may be selected where most convenient, either off the wharves of the city or farther up off the dockyard, where the commissioner's buoy will serve to point out the Dockyard Shoal.

Examination anchorage.—The examination anchorage formerly off Macnab Cove is located southward of the telegraph cable between George Island and the eastern shore and northward of Ives Knoll.

Caution.—Vessels should not anchor in such a position as, when swinging to approach within 400 yards of any of the commercial wharves.

Wharves.—The wharf accommodation is spacious. There are 17 wharves, capable of accommodating coasting and freighting vessels, with an area of 125,559 square feet, upon which a number of sheds are built; 22 wharves capable of accommodating steamers from 1,600 tons upward, with an area of 114,986 square feet, the depth of water measuring from 29 to 46 feet. At these wharves vessels can unload into the sheds and load from them.

The Kings Wharf has a frontage of 250 feet and depth of water of 20 feet.

The Richmond Depot (Intercolonial Railway) Wharves have tracks to the vessel's side and to the sheds. No. 1 Wharf is the immigration wharf and shed. No. 2 Wharf is 700 feet from bulkhead to end, 235 feet wide, with a depth of 45 feet, has four tracks, one on each side and two in the center. The wharf is covered with one two-story shed 700 feet long, with a total width of 199 feet. The ground floor of the shed is 4 feet above the base, to facilitate loading and unloading from cars. It is intended for the present to use the upper story for immigration purposes, pending the erection of further projected terminals. No. 3 Wharf, length 620 feet by 165; shed 590 feet by 125, with grain carrier, four tracks; depth of water, 27 to 30 feet. No. 4 Wharf, length 550 feet by 90; shed, 435 feet by 56; two coal chutes, three tracks; water, 27 to 30 feet. No. 5 Wharf, 450 feet long by 40 feet; no shed; two tracks; water, 22 to 25 feet. No. 6, Deal Wharf, 450 feet by 82; no shed; four tracks; water, 20 to 47 feet. No. 7 Wharf, length 613 feet by 65; no sheds; four tracks; water, 17 to 24 feet. No. 8 Wharf, length 755 feet by 123; shed 650 feet by 65; four tracks; water, 22 to 35 feet. No. 9 Wharf is 725 feet long and 110 feet wide, with two tracks and shed 600 by 54 feet; depth of water, 24 to 30 feet. There is berthing accommodation for ocean-going steamers at Government Piers Nos. 2, 3, 4, 5, 6, 7, 8, and 9 which will berth two at each wharf.

Lights.—Two fixed red lights, placed vertically, 4 feet apart, are shown from the end of the Furness Line Wharf.

Two fixed lights, white above red, placed vertically, are shown from No. 3 Wharf, and also from No. 4 Wharf, of the Deep Water Terminus (Intercolonial Railway). (See Light List.)

Outer light and whistle buoy.—A cylindrical buoy, painted in black and white vertical stripes and surmounted by a pyramidal frame supporting a whistle and lantern, exhibiting an occulting white light elevated 30 feet above the sea and visible 10 miles is moored in 36 fathoms 9½ miles 106° from Chebucto Head Lighthouse.

Inner light and whistle buoy, which is about 10 miles 316° from the preceding, is a red cylindrical buoy surmounted by a pyramidal cage supporting a whistle and lantern, exhibiting an occulting red light. It is moored in 20 fathoms water about 2 miles 22° from Chebucto Head Lighthouse.

The whistles of the buoys are sounded by the action of the waves.

Submarine bell buoy.—A red cylindrical buoy, surmounted by a pyramidal steel frame, with an openwork bell-shaped top mark, and having dependent from it a submarine bell operated at irregular intervals by the motion of the buoy on the waves, is moored about 100 yards 338° from Halifax Inner Light and Whistle Buoy.

Caution.—Owing to their exposed position and to the prevalence of drift ice in the winter, the positions of the buoys in Halifax Harbor, and the approach, can not be implicitly relied on; but great attention is paid to replacing them when it is known that they have broken adrift or been moved.

Western shore of the harbor—Portuguese Cove.—About 1¼ miles northward from Chebucto Head is Portuguese Cove; and on a hill, 175 feet high, 800 yards westward from the cove, stands Camperdown flagstaff.

Camperdown signal station.—From Camperdown signal station information respecting approaching vessels is transmitted to the signal station at the Citadel in Halifax, whence timely notice of the approach of vessels is given to the several local shipping authorities. In order to facilitate the business of the port, it is essential that vessels should promptly display the registered numbers of their vessels, or show their house flags, as soon as they sight the Camperdown signal station.

Radio station.—A radio station is established on Camperdown Heights, and vessels fitted with the Marconi apparatus can communicate with it. The station is open both day and night, the call letters being V C S.

Radio time signals.—A special apparatus at this station automatically transmits time signals by radio to vessels within the zone of the station; the time given from the observatory at St. John, which is electrically connected with Camperdown, being as follows:

(a) Commencing at 9h. 58m. 0s., a. m., dots are made each second up to, and including, 9h. 58m. 57s., a. m.

(b) Recommencing by a dot at 9h. 59m. 0s., a. m., followed by a pause of two second, a dot will be made every second from 9h. 59m. 3s., up to and including, 9h. 59m. 50s., a. m.

(c) A final dot will be made at 10h. 0m. 0s., a. m., which concludes the series.

The above signals will be made on very day, except Sunday, the time transmitted being the Standard time of the 60th meridian of west longitude, or 4 hours slow on Greenwich Mean time.

Storm signals are shown at Camperdown.

Herring Cove, distinguished by the steeple of a chapel and the houses of the fishermen on its rocky shore, is 3 miles to the northward of Portuguese Cove. It is a secure harbor for small craft and boats, having 6 feet at low water in its narrow entrance, and 8 feet, over soft mud, within. At its head a brook discharges the waters of a chain of small lakes.

Herring Cove Light, fixed red, elevated 45 feet above high water, visible 8 miles, is exhibited from a white square wooden tower, 22 feet in height, on the southwestern side of the entrance to Herring Cove.

Lifeboat.—A lifeboat is stationed at Herring Cove.

York Redoubt, elevated 177 feet above the sea, forms a conspicuous object on the western shore, and may be easily recognized by its flagstaff and position; it stands within 200 yards of the shore, ¾ mile to the northward of Sandwich Point, and nearly abreast the lighthouse on Mauger Beach.

Purcell Cove—Shoal—Buoys.—The shoal, which dries 2 feet on the northern side of the entrance to Purcell Cove, is marked by a black can buoy, moored in 5 fathoms, about 100 yards eastward of this rock, and by a red spar buoy 150 yards southwestward of it.

Northwest Arm.—The entrance of the Northwest Arm is between the southwestern side of Pleasant Shoal and the shoals in Purcell Cove. It carries a depth of from 6 to 8 fathoms; and large vessels may ascend it through a narrow channel to within ½ mile of its head, or nearly to Melville Island, a distance of 2.3 miles.

Pleasant Point, at the entrance of the Northwest Arm, is 1.4 miles northward of York Redoubt, and will be recognized by its batteries and by Prince of Wales tower on its summit, 114 feet above the sea.

The eastern shore of the harbor is less rocky and barren than the western, being formed of ridges of drift sand, clay, and bowlders, resting on clay-slate; it is inhabited all the way to Dartmouth.

Devil Island, composed of clay-slate, is 15 feet high, 800 yards in length, and lies off Hartland Point. A reef connects this island with the shore, and shallow water extends from it 600 yards seaward.

Devil Island Lights, fixed white, elevated 52 feet and 59 feet above high water, visible 12 and 13 miles, respectively, are exhibited, each from an octagonal white lighthouse, 175 yards apart, 61° and 241° from each other, the eastern building being 53 feet and the western 45 feet in height, on the southern part of Devil Island. (See Light List.)

Lifeboat.—A lifeboat is stationed at Devil Island, the lifeboat station being near the northwestern end of the island.

Telephone.—The lifeboat station is connected by telephone to the mainland.

The line consists of a land line on Devil Island, a cable from Devil Island to the mainland, and a land line on the mainland from the shore to the Nova Scotia Construction Co.'s offices, which are connected by wire with Dartmouth and Halifax.

Barrie Beach, 1 mile to the northward of Devil Island, is of shingle and forms a shallow creek, affording shelter to boats.

Eastern Passage.—The southern entrances to the Eastern Passage lie on either side of Lawler Island; that to the eastward, between the island and the mainland, being the deeper and having a depth of 10 feet over its bar at low water. Only 5 feet at that time of tide can be carried through between Lawler and Macnab Islands, and there are rocks in the entrance and off the southern end of Lawler Island.

The Eastern Passage being very narrow and only adapted for small vessels, it will merely be necessary to direct attention to the 1-fathom shoal lying 250 yards southward of Hinds Wharf on the eastern shore of the mainland and ½ mile to the northward of Lawler Island, and also to the rock lying 200 yards off the northeastern point of Macnab Island, these being the only detached dangers in the passage after passing the bar.

Dangerous area.—Four red spar buoys surmounted by crossheads, painted red and white, have been placed in the southern fairway to Eastern Passage between Thrumcap Shoal and Devil Island at a distance of 3,000 yards from the butts to indicate clearly the area of water seawards liable to be struck by spent or ricochet bullets from the rifle ranges on Macnab Island.

The buoys are moored in a line trending westward at distances of 500 yards apart, the eastern buoy being 1,400 yards from Devil Island Western Lighthouse.

Any vessel or boat passing inside these buoys during the hours of practice incurs serious risk, and no attempt should under any circumstances be made to cross the above area as long as the red flag is hoisted at the southern end of Macnab Island. The buoys are withdrawn after the annual musketry course and replaced when necessary.

Buoys.—Eastern Passage is marked by buoys.

Macnab Isand, on the eastern side of the Ship Channel into Halifax Harbor, is 3 miles long, including its shingle beaches.

The island is well cultivated and has hills of sand, clay, and bowlders of various elevations, the maximum height being 152 feet above the sea.

Macnab Cove is immediately northward of Mauger Beach, and in it there is good anchorage in a depth of about 7 fathoms, mud, the best berth being with Sandwich Point seen over the Horse Shoe Shoal and the western sides of George Island and Ives Point in range.

Macnab Island Light, fixed white, elevated 132 feet above high water, visible 17 miles, is exhibited from a square wooden tower, 49 feet in height, and surmounting the roof of a dwelling. The tower and dwelling, situated about 1 mile 355° from Mauger Beach Light are painted white, with a red vertical stripe on the seaward side.

Mauger Beach forms the western extremity of the island; on it stands Sherbrooke Tower, which shows out as a very conspicuous object from the entrance of the harbor; shoal water extends 400 yards westward from the point.

Directions.—When Sambro Light bears 227° this light should not be brought to the westward of 399°, which clears the Thrumcap Shoal. Passing Mauger Beach entering harbor keep the light on starboard bow.

Mauger Beach Light, flashing white, elevated 64 feet above high water, visible 13 miles, is exhibited from Sherbrooke Tower, 60 feet in height, cylindrical and built of white granite, with a red lantern and roof.

Fog signal.—During thick or foggy weather a diaphone horn worked by compressed air is sounded.

The horn, elevated 37 feet above high water, projects from the southern side of the lighthouse. The fog-signal house is a square wooden building, painted white with a red roof standing near the lighthouse.

Range.—This light in range 355° with Macnab Island Light leads through the deepest water after passing Chebucto Head, until George Island and Dartmouth Lights are in range.

George Island will be readily known by its redoubt and tower.

George Island Light, occulting red, elevated 50 feet above high water, visible 8 miles, is shown from a mast on the western side of George Island. (A new lighthouse is being constructed.)

Fog signal.—A bell is struck by machinery. (See Light List.)

Prohibited anchorage.—Vessels are not allowed to moor in Halifax Harbor westward of the line of the lighthouse on George Island and Mauger Beach Light, to leave room for vessels going alongside the wharves.

Channel closed.—Vessels must not anchor within 300 yards of a line joining George Island Pier and Fort Clarence Pier.

Little Thrumcap Islet, about 2 miles westward of Devil Island, is 33 feet high and 300 yards long, and connected with the southwestern extremity of Macnab Island by long shingle beaches, inclosing a shallow lagoon; its cliff of red sand and clay is fast wasting by the action of the sea. Big Thrumcap is 800 yards northeastward of it.

Thrumcap Shoal extends 1 mile to the southward from the islet, and forms one of the principal dangers at the entrance of the harbor, there being only ½ fathom of water at 1,200 yards and 2¾ fathoms water at 1,800 yards from Thrumcap Islet.

Clearing mark.—Devil Island Western Light open southward of the Eastern Light, bearing 58° leads southward, and George Island Light open westward of Sherbrooke Tower leads westward of Thrumcap Shoal.

Light and bell buoy.—A red cylindrical buoy, surmounted by a steel frame carrying a bell and lantern from which a flashing red light every five seconds is exhibited, is moored about 600 yards southward of Thrumcap Shoal and 1.5 miles 178° from the flagstaff on Big Thrumcap Island. The bell is sounded by the movement of the buoy.

Lighthouse Bank extends about 1,400 yards to the southward from Mauger Beach and has one patch of 2¾ fathoms and several patches with 3 fathoms.

The 2¾-fathom patch lies 750 yards 166° from Mauger Beach Lighthouse.

Clearing mark.—Devil Island Lighthouses open southward of Macnab Island (seen over the shingle beaches), bearing 101°, lead southward of the bank.

Buoy.—A red conical buoy is moored in about 6 fathoms on the southern edge of Lighthouse Bank ½ mile 171° from Mauger Beach Lighthouse.

Lighthouse Bank Light and Bell Buoy, red, cylindrical, surmounted by a steel frame supporting a bell and lantern from which a fixed red light is exhibited, is moored on the southwestern edge of the bank.

Horse Shoe Shoal.—Shallow water extends southwestward and northward from Mauger Beach to the distance of 400 yards. In the latter direction the rocky ground, known as Horse Shoe Shoal, dries at low water, and great caution is necessary not to borrow too close on this danger when entering or leaving Macnab Cove.

A red conical buoy is moored in about 6 fathoms at the northwestern extremity of Horse Shoe Shoal.

Ives Knoll, nearly awash at low spring tides, rises from the rocky bank which extends 800 yards from the beach to the northward of Ives Point, or toward George Island.

Ives Knoll Light Buoy, red, cylindrical, surmounted by a pyramidal steel frame supporting a lantern, from which an occulting red light is exhibited, is moored in 8 fathoms near the western side of the above rocky bank and 200 yards westward from the knoll.

Portuguese Shoal, a small rocky patch with 4½ fathoms least water, lies 1,400 yards 229° from the shoalest part of Rock Head Shoal, and from it the eastern point of George Island is in line with Sherbrooke Tower on Mauger Beach, and Camperdown Flagstaff bears 240°. Sambro Island is concealed behind Chebucto Head.

A buoy, painted red and black in horizontal stripes, is moored in 6 fathoms on the southwestern side of Portuguese Shoal.

Note.—This buoy lies 1,100 yards northeastward from the inner light and whistle buoy, and about midway between the two buoys there is a rocky head with a depth of 5¼ fathoms.

Rock Head Shoal, the most dangerous shoal off the entrance of Halifax Harbor, is about 700 yards long, in a north and south direction, and its shoalest part, with a depth of 3¼ fathoms, lies with George Island Lighthouse open westward of Ives Point, bearing 330°; the western extremity of Sambro Island in range with Ketch Head 209°, the lighthouse on the island being open, and Western Lighthouse on Devil Island, bearing 27°, distant about 2¼ miles. About 400 yards to the northward of the shoalest part there is a patch of 3½ fathoms.

A buoy, painted black and white in vertical stripes, with staff and cage, is moored near the southern end of this shoal in 6¾ fathoms.

Clearing marks.—Sambro Island, bearing 209°, kept well open southeastward of Ketch Head, leads southeastward of Rock Head and Portuguese Shoals, but only just clear of the buoy marking the former. George Island, seen well open westward of Mauger Beach Lighthouse Tower, bearing 338°, will lead westward of them (but close to the buoy marking Portuguese Shoal), and also nearly midway between Neverfail and Thrumcap Shoals.

Neverfail Shoal, upward of 200 yards long, has on its shoalest part a depth of 4¼ fathoms, and from it the eastern side of George Island appears in range with the steeple of a Roman Catholic Chapel at Dartmouth; the tower on Pleasant Point is seen over the point at York Redoubt and the southeastern end of Lawler Island over the southeastern extremity of the shingle beach southward of the Thrumcap.

Light buoy.—A cylindrical buoy, painted red and black in horizontal bands, and surmounted by a conical topmark and lantern, from which an occulting white light is exhibited, is moored in 6 fathoms, nearly 300 yards southward of Neverfail Shoal.

Lichfield Shoal, of small extent, with a depth of 2¼ fathoms on its shoalest spot, lies 1,400 yards westward from Neverfail Shoal.

A black can buoy, with staff and cage, lies on the eastern side of Lichfield Shoal.

Clearing mark.—The Citadel flagstaff, apparently just in range with Sandwich Point, bearing 337°, leads about midway between it and Neverfail Shoal, which is the most direct channel, but the deepest water is between Lichfield Shoal and the western shore, 1,400 yards.

Mars Rock, with a depth of 3 fathoms, is the shoalest part of a rocky bank separated from the shore, between Herring Cove and Sandwich Point, by a narrow channel.

A black buoy, surmounted by a staff with an iron flag, is moored in a depth of 6 fathoms on the eastern side of Mars Rock.

Middle Ground, a narrow gravel ridge, about 200 yards in length in a northerly and southerly direction, with about 4¾ fathoms least water, 1,600 yards lies 309° from Mauger Beach Lighthouse.

Clearing mark.—Dartmouth Lighthouse (the Exhibition (Rink) Tower of Dartmouth) in range 340°, with George Island Lighthouse, leads eastward; and Chebucto Head Lighthouse, bearing 168°, open eastward of Sandwich Point, or the spire of the Dartmouth Presbyterian Church in range, 351°, with the eastern extremity of George Island, leads westward of Middle Ground.

Light buoy.—A cylindrical steel buoy, painted red and black in horizontal bands, and surmounted by a conical top mark and lantern, from which an occulting white light, visible 4 miles, is exhibited, is moored in 6 fathoms about 200 yards to the southward of the Middle Ground.

Pleasant Shoal, which extends ½ mile in an easterly direction from Pleasant Point, is covered by only a few feet of water nearly out to its edge. A portion of this shoal, extending about 200 yards in a southeasterly direction from Pleasant Point, named Hen and Chickens, dries 4 feet at low-water springs. Pleasant Shoal is much in the way of vessels, as it diminishes the breadth of the navigable channel between it and Ives Point to ½ mile.

A red conical buoy marked "Hen and Chickens" is moored in 7½ fathoms on the southern side of Hen and Chickens Shoal.

Point Pleasant Bell Buoy, black, with "Pt. Pleasant" in white letters, is moored in 10 fathoms off the eastern extremity of Pleasant Shoal, with Pleasant Point bearing 272°, distant 1,280 yards.

Clearing marks—Inner range.—Proceeding inward from the intersection of the alignment of Mauger Beach and McNab Island Lights with the alignment of George Island and Dartmouth Lights, keep George Island and Dartmouth Lights in range bearing 340°. This leads well clear of Point Pleasant Shoal and also Middle Ground.

Buoy.—A black buoy is moored about 50 feet outside the head of the new breakwater.

Wreck.—The wreck of the steamer *Havana* lies sunk in 15 fathoms 350 yards 120° from this buoy, with her masts 40 feet below the surface of the water. Vessels should not anchor in this vicinity.

Channels—Description.—The main channel at the entrance, between the Inner Light and whistle buoy and the western shore, is about 1¼ miles broad. It is about 1½ miles wide between Neverfail Shoal and the western shore and between that shoal and Mars Rock, but Lichfield Shoal, marked by a black buoy, lies in the center of the channel.

On either side of Middle Ground, and between Macnab Island and Pleasant Shoals, the channels have a breadth of between 1,000 and 1,200 yards. Westward of George Island is a clear deep channel, which is 300 yards wide between the 5-fathom curves.

To the eastward of George Island the channel is ½ mile wide, and equally free from obstructions; the shallow water does not extend beyond 150 yards from either end of George Island, and not above 100 yards from either side.

Dockyard Shoal.—Deep water approaches very near the wharves of the city, until to the northward of the Deep Water Terminus, where there is a shoal which, for the distance of 400 yards, projects out about 30 yards beyond the line of the outer ends of the wharves.

Measured mile.—Three pairs of beacons to mark a measured mile, on which vessels may try out their speed, have been erected in Bedford Basin, as follows:

The beacons marking the alignment of the measured mile, 331°, are situated in the northwestern corner of the basin, and those marking the ends of the mile are situated 1½ and 2½ miles farther southward on the western side of the basin.

The front range beacons in each case have white triangular tops and are situated at high-water mark; the rear range beacons have square tops, with a dark stripe down the middle, and are about 250 feet 241° from the front ones.

The ends of the mile are marked by two steel buoys carrying flags.

Navy Island Anchorage.—On the eastern side of Bedford Basin, 1½ miles from the Narrows, there is a small but secure anchorage within Navy Island. The entrance is to the northward of the island, and the only thing in the way is an old wreck, over which there is a depth of 3 fathoms at low water.

Tides.—The high water interval at Halifax is 7h. 33m.; mean range 4.3 feet, spring range 5.2 feet. The rise is greatly influenced by the winds, southerly winds causing high and northerly winds low tides, and should the winds chance to act in accordance with the diurnal inequality the rise of the morning and evening tides of the same day may possibly differ to the amount of a foot or even more in extreme cases.

From the foregoing causes the rise of spring tides varies from 5 to 7 feet and of neap tides from 4 to 5 feet above the ordinary low water in spring tides. Extraordinary spring tides, aided by strong southerly winds, have risen 8 feet, and extraordinary neap tides only 3 feet above the average low water in spring tides. The ordinary velocity of the tidal current does not exceed ½ knot an hour.

Black Rock.—This detached rock, lying close inside the 5-fathom curve, has about 3¾ fathoms on it at low water, with about 4¾ fathoms between it and the wharves.

The clearing mark for Black Rock is now the extension of Richmond Depot Wharf in range with the Dartmouth Shore, bearing 298° 30′.

Dartmouth.—Off the shore frontage of the town of Dartmouth the 5-fathom curve extends 300 yards out from the wharves and 400 yards to the southward from the western point of Dartmouth Cove.

The town is connected with Halifax by ferry; it has five churches and one hotel, besides stores and factories for sugar refining, soap, rope, etc., three sawmills, rolling mills, and boiler works.

Dartmouth Light, fixed red, elevated 140 feet above high water, visible 12 miles, is shown from the tower, 70 feet high, painted white, with a black diamond on the southern side of Dartmouth Exhibition Building. This light is the rear range light of the inner range and is only visible on the line of range. (See Light List.)

Buoy.—A red conical buoy is moored in 4¼ fathoms off Dartmouth Spit, 700 yards 162° from the Exhibition Tower and about 200 yards northwestward of Black Rock.

Rock.—A rocky patch of small extent, with a depth of 4 fathoms over it at low-water springs, lies off the shore of Dartmouth, about 650 yards 24° from the dockyard flagstaff, and 700 yards 232° from the light on the Exhibition Tower.

A red nun buoy marks this 4-fathom patch.

Bedford Basin.—Bedford Basin, which has a depth of 36 fathoms and is navigable quite to its head, has a clear passage into it for large vessels through the Narrows. The principal danger in the basin is Wellesley Rock, upon which there is a depth of 2 fathoms. This lies about one-third over from the eastern toward the western side, with the outermost bare rock off the eastern shore (distant 600 yards), in range with a house at the head of the basin, bearing 317°. Immediately after passing Wellesley Rock the channel is contracted to the breadth of 300 yards by islets and rocks on either side, but it has a depth of 8 fathoms in it and leads to a secure anchorage off the entrance of Sackville River in 7 fathoms, mud.

In the Narrows the tide, both at the ebb and flood, sets obliquely toward the Dartmouth shore.

Bedford Range Lights.—The front light, fixed white, visible 3 miles in the line of range is exhibited, 37 feet above high water, from a locomotive headlight reflector lantern placed on a white wooden pole, with shed at its base, about 150 yards westward of the point on the western side of the entrance of Tufts Cove.

The rear light, fixed white, visible 3 miles in the line of range is exhibited, 73 feet above high water, from a locomotive headlight reflector lantern placed on a white wooden pole, with a shed at its base, 1,000 feet 319° from the front light.

The lights in line 319° lead from a point abreast the dockyard to the entrance to Bedford Narrows. When within about 400 yards of Tufts Light Buoy course should be changed to 289° which will lead through the Narrows, leaving Tufts Cove Light Buoy on the starboard hand and Africville Light Buoy on the port hand.

Tufts Cove Light Buoy, cylindrical, painted red, exhibiting an occulting red light is moored in 5¾ fathoms on the northern side Bedford Narrows, off Tufts Cove.

Africville Light Buoy, cylindrical, painted black, exhibiting an occulting white light is moored in 5 fathoms on the southern side of the Narrows at the inner end.

Halifax approach—Directions.—Vessels of deep draft should use the western passage between Lichfield and Neverfail Shoals in preference to the eastern channel between Neverfail and Thrumcap Shoals.

Approaching from the westward during the daytime, pass Sambro Lighthouse at the distance of 3 or 4 miles, and when Sandwich Point is seen open eastward of Chebucto Head, 347° (the clearing mark for the eastern side of Sambro Ledges), steer to the northward and pass Chebucto Head and the coast to the northward at a distance of ½ mile until Mauger Beach and Macnab Island Lighthouses are in range, 355°; steer on this range between Lichfield and Neverfail Shoals, and eastward of Mars Rock, until George Island Lighthouse and Dartmouth Lighthouse (Exhibition Tower) are in Range 340°, then steer with them in range, passing 250 yards eastward of Middle Ground, Pleasant Shoal, the sunken wreck, and westward of Lighthouse Bank, Mauger Beach Shoal, and Ives Knoll, to George Island, which can be passed, as already stated on either side.

Also the citadel flagstaff, seen open eastward of Sandwich Point, bearing 338°, will lead between Lichfield and Neverfail Shoals and to Mars Rock buoy.

When past Sandwich Point, keeping Chebucto Head just in sight eastward of Sandwich Point will keep a vessel clear westward of the Middle Ground; and the head opened out more to the eastward will enable her to clear Pleasant Shoal and breakwater buoy to the westward, but care must be taken to avoid the sunken wreck 400 yards southeastward of the breakwater.

By night.—In approaching Halifax Harbor from the westward at night, shape course so as to pass at a convenient distance the light and whistle buoy (light vessel in winter months) on the outer bank, about 6¼ miles 156° from Sambro Island Light; or, keep in not less than 30 fathoms water until Sambro light bears 339°.

Having crossed Outer Bank, and when Mauger Beach Light opens out eastward of Chebucto Light, alter course to the northward, and pass about ½ mile from Chebucto Head. After passing Chebucto Head, steer to bring Mauger Beach Light in range, 355°, with Macnab Island Light, and proceed along this range until George Island Light is in range with Dartmouth Light (Inner Range), and then proceed as already directed.

With adverse winds and clear weather, the chart and range marks already given for clearing the dangers will enable sailing vessels to work in or out of Halifax Harbor without difficulty.

From the eastward.—Having passed Devil Island, steer for Chebucto Head and keep Sambro Island well open of Ketch Head, bearing 212°, to pass southeastward of Rock Head and Portuguese Shoals, taking care to keep clear of Rock Head Shoal buoy; and when George Island is seen open westward of Mauger Lighthouse, bearing 338°, steer in on the latter course, passing westward of the Portuguese Shoal and its buoy, and between Neverfail and Thrumcap Shoals. For vessels of heavy draft, however, it will be better not to cross the bank on which Portuguese Shoal is situated, but to round the light and whistle buoy at its southwestern end, and get on the outer range 355° northward of the shoal.

After passing the light and bell buoy marking the Thrumcap Shoal, steer over for Sandwich Point, until the Dartmouth Exhibition tower and George Island Lighthouse (Inner Range) are in range bearing 340°; these marks, which are reported to be easily made out, will lead clear of all dangers up to George Island which may be passed on either side. It is stated also that these marks can be used for passing between Neverfail and Thrumcap Shoals; it will, however, take a vessel within 300 yards of the former.

By night.—Approaching from the eastward by night, and being to the westward of Jeddore Ledges, steer along the land in a depth of not less than 30 fathoms, for the outer light and whistle buoy, and, passing it at a convenient distance steer northwestward for the inner light and whistle buoy, after passing which alter course to steer on the outer range lights in line 355° and pass between Neverfail and Thrumcap Light buoys, and from thence bring the Inner Range Lights 340° (George Island Light in range with Dartmouth Light) and steer on that range for the harbor.

If the outer and inner light and whistle buoys are not in position, steer along the coast as mentioned above until Sambro Island Light is seen; then, if it be intended to pass southeastward of the Rock Head and Portuguese Shoals, steer for Chebucto Head Light (remembering that, to clear the Rock Head, Sambro Island Light must be kept wide open eastward of Ketch Head, bearing 209°, and Devil Island Lights should not bear eastward of 19°) until Mauger Beach Light bears 338° when it should be steered for on that bearing; passing southwestward of the buoy marking Portuguese Shoal. Having passed the shoal steer to pass midway between the light buoys marking Neverfail and Thrumcap Shoals by bearings of Mauger Beach Light. When Herring Cove Light bears 249° steer in on the Inner Range and proceed on this range close to the eastward side of Middle Ground and about mid-channel between the new breakwater and Ives Knoll buoy.

Having passed Ives Knoll the vessel may proceed in on either side of George Island, or may anchor where convenient until daylight, according to circumstances. Mauger Beach Light disappearing behind Ives Point will show the distance from George Island, when proceeding to the eastward of that island, through the wider, and consequently preferable, channel during a dark night. Within George Island there is nothing in the way.

Between Rock Head and Thrumcap Shoals.—Should circumstances render it necessary to use the passage between the Rock Head and Thrumcap Shoals, proceed as follows:

Having passed Devil Island, keep Graham Head open southward of Devil Island the whole breadth of the island, which mark will lead to the southward of the Thrumcap Shoal and light and bell buoy, and when George Island is seen open westward of Mauger Beach Lighthouse bearing 338°, steer in on this course, until abreast the Thrumcap Buoy, when proceed as before directed.

By night.—Having made Sambro Island Light and passed Shut-in Island, steer to pass not less than ½ mile, or more than 1 mile, southward of the lights on Devil Island, steer to pass midway between the light buoys marking Thrumcap and Neverfail Shoals by bearings of Mauger Beach Light, when proceed as before directed.

Caution.—During a dark night or a thick fog do not approach Sambro Ledges within the 50-fathom curve, as a depth of 40 fathoms will be found ½ mile eastward and 1 mile southward of these dangers. For the remainder of the coast it would not be advisable to approach within the 40-fathom curve, but it must be borne in mind that this depth may be found within the distance of 3 miles of some of the most formidable dangers between Halifax and Cape Canso, as, for instance, the Jeddore Ledges.

Hartland Point, the eastern point at the entrance to Halifax Harbor, is about 1 mile northeastward of Devil Island.

Osborne Head, at the eastern entrance to Cow Bay, is a prominent point, 104 feet high, with reddish cliffs; it is 1.5 miles northeastward of Hartland Point.

Cole Harbor is situated at the head of the large bay eastward of Halifax Harbor, formed between Shut In and Devil Islands. The harbor has a dangerous bar of sand with only ½ fathom at low water, which is covered with breakers whenever any sea is running. It is only during fine weather and with a smooth sea that boats can safely cross it to the entrance, which is barely 80 yards wide between points of shingle and sand. In this narrow entrance the depth is 2 fathoms and the velocity of the tidal current from 1 to 2 knots, but immediately within it the depth diminishes to 4 or 5 feet, and narrow channels between mud flats, partially dry at low water, extend 2 miles inland.

Communication.—There is a telegraph station at Cole Harbor.

Egg Islet is about 1,400 yards southwestward from Lawrenceton Head; it is low and narrow and connected with the shore by a reef and shingle beach; shoal water extends 600 yards southward of the islet, where it terminates in a depth of 5 fathoms, nearly 1 mile from the main shore.

Lawrenceton Head is a peninsula, 92 feet high, composed of drift sand, clay, and bowlders resting on clay slate and united to the shore by long beaches of stones or shingle, the red cliffs of which form the distinguishing feature of this part of the coast.

Lawrenceton Lake.—The entrance of this lake, admitting boats only in fine weather, is ½ mile to the eastward of Egg Islet and on the western side of Lawrenceton Head.

Graham Head is a peninsula with red cliffs 60 feet high.

Porter Lake.—The entrance to this lake is on the western side of Graham Head. The lake extends 7 miles to the northward and receives the waters of other lakes still farther inland. It has in some parts depths of 4 and 5 fathoms, but there is only 1 foot at low water in its very narrow entrance.

Shut In Shoals extend about 1¼ miles westward and ¾ mile southward of Shut In Island. These shoals are composed of rock, with 2½ fathoms least water and are extremely dangerous.

Clearing mark.—The red cliffs of Seller Head, seen open eastward of the eastern entrance point of Three Fathom Harbor, bearing 15°, leads southeastward and the lighthouses on Devil Island, bearing 266° lead southward of Shut In Shoals. There are soundings of 20 fathoms about 1 mile from these shoals, and vessels should not approach nearer than that depth at night or in foggy weather.

Shut In Island, 600 yards long and composed of low clay slate rock, lies ½ mile from Graham Head, but is united to it by a reef and beach of shingle. It forms the western side of the entrance to Three Fathom Harbor.

Light and bell buoy.—A light and bell buoy, painted in black and white vertical stripes and marked "Shut In Island," surmounted by a steel frame supporting a bell and lantern from which an occulting white light is exhibited, is moored about 1¼ miles 140° from the southwestern point of Shut In Island.

Three Fathom Harbor.—The entrance is close to the eastward of Shut In Island, quite open to the southward, and affords shelter only to small vessels, which can run into the narrow channel eastward of Ball Islet, 1 mile within the entrance. The depth there is 3 fathoms mud; but to reach it, the low water depth of about 1¼ fathoms (with a 4½ feet rise at spring tides) must be passed over.

The entrance to this harbor, between reefs that partly dry at low water, is 100 yards wide between the 3-fathom curve on either side, the depth in the channel being 3½ fathoms, but it decreases to about 1¼ fathoms, a short distance within, as already noticed. It is an excellent fishing station, but useless for shipping, excepting as a harbor of refuge in case of distress, when a vessel might run in until she grounded on the mud within the reefs.

The range mark for running in is the western side of Ball Islet and a white house on a hill at the head of the harbor in range bearing 339°. This bearing will lead close to Shut In Island Light and Whistle Buoy.

Chezzetcook Inlet, about 3 miles northward, is ½ mile wide at its entrance between Gatz Head and Story Head, the latter situated 3.8 miles 40° from Shut In Island.

This inlet extends 5 miles inland and receives at its head the waters of Chezzetcook and other lakes. There are several islands in it, forming beautiful scenery, but the place is useless to shipping, having only ½ fathom at low water on the bar of the western and principal channel, which commences ½ mile within Cape Entry and continues to the head of the inlet. Both channels are very narrow and wind through flats of sand, mud, and weeds which dry at low water. The shores of these inlets are well settled, especially near the heads, where the road from Dartmouth passes and continues to Ship Harbor and Guysborough.

Buoys.—Three spar buoys mark the channel leading to Chezzetcook.

Tidal currents.—At the entrance of Chezzetcook, Petpeswick, and Musquodoboit Inlets the ordinary velocity of tidal currents is from

2 to 3 knots an hour, but heavy rains or the melting of winter's snow have been known to increase the velocity of the ebb current in the entrance of the Musquodoboit Inlet to fully 4 knots.

Pat Shoal is a small rocky patch, with only 4½ fathoms water, bearing 60°, nearly 3 miles from Shut In Island and 1.5 miles 173° from Story Head. There is a depth of 12 fathoms about 700 yards to the southward of Pat Shoal.

Nearly midway between Pat Shoal and Petpeswick Head and 1¼ miles 120° from Story Head there is a 5-fathom patch about ¼ mile in extent; a smaller patch, with the same depth, lies about 1¼ miles 92° from the former, about ½ mile southward of Codray Shoal.

Codray Shoal, situated 1,600 yards southwestward of Petpeswick Head on the bank extending from it, has 4¼ fathoms least water on it.

Round Shoals are two patches with 4½ and 4¾ fathoms on them; the former is situated 1,800 yards southeastward of Flying Point.

Petpeswick Head, about 6 miles northeastward of Shut In Island, is 130 feet high, and from seaward appears like an island of pyramidal form; from a distance of 3 or 4 miles it has the appearance of a brickwork fortification.

Petpeswick Inlet is ½ mile wide at the entrance, which is on the western side of Petpeswick Head. After crossing the bar of sand, about 1 mile within the entrance, on which the depth is only 1 fathom at low water, there commences a narrow channel, between mud flats uncovered at low water, which is navigable a distance of 5 miles, to the head of the inlet, for any vessel that can cross the bar. Within 1 mile from the head of the inlet the mud flats recede on either side, leaving an open space, in which there is a depth of 6 fathoms. There are reefs off the entrance points of this inlet, and a small rock, with only 1 fathom over it, lying ¼ mile off the western side of Petpeswick Head. On these the sea breaks heavily, as it does also on the bar, which is very dangerous to boats.

Buoys.—A black can buoy is moored ¼ mile southward of Split Rock Point; a red spar buoy marks the starboard side of the bar, and a black spar buoy the port side.

Petpeswick Shoal is a small patch of rock, with 4¾ fathoms on it, 5½ miles 79° from Shut In Island, and 2½ miles 167° from Petpeswick Head. There are irregular soundings of 6½ and 7 fathoms for a short distance around, and 16 fathoms outside or to the southward, within the distance of ½ mile.

Musquodoboit Shoal, situated 2 miles 238° from Jeddore Head, is composed of rock, and is 1,200 yards long northeast and southwest. The least depth on it, 3 fathoms, is nearly in the center.

These shoals, the two latter of which lie outside a line drawn from Shut In Island to Jeddore Head, are exceedingly dangerous to large vessels. Musquodoboit Shoal is frequently marked by breakers; Pat and Petpeswick Shoals only occasionally, after heavy gales, when they break at irregular intervals and become dangerous to small vessels and boats.

Whistle buoy.—A whistle buoy, painted in black and white vertical stripes, marked "Musquodoboit," is moored about 1 mile 226° from Musquodoboit Shoal.

Musquodoboit Inlet, immediately westward of Jeddore Head, contains many islands and is navigable for small vessels and boats a distance of 7 miles, where it receives the waters of the Musquodoboit River. Over the bar, at the entrance of the principal channel, which is on the eastern side of the inlet and 1¾ miles northwestward from Jeddore Head, a depth of 10 feet can be carried at low water; but Dumbrock Rock, with only ½ fathom water over it, lies directly in the way and renders the entrance both difficult and dangerous.

Within the bar, in a channel 250 yards wide, there is a depth of 3 fathoms between flats of sand, mud, and weeds, which uncover at low water. About 4 miles within the bar the channel becomes very narrow and only 7 or 8 feet deep, but small vessels and boats can ascend with the tide to the head of the inlet.

Harbor Islet lies ¾ mile off the entrance of Musquodoboit Inlet and about 1½ miles 288° from Jeddore Head. It is small and stony and from it a rocky shoal, on which are the Musquodoboit Ledges, extends upward of 1 mile to the southward and to within ½ mile of the Musquodoboit Shoal. A depth of 2 fathoms may be carried past Harbor Islet on either side, but the channels are covered with breakers during a strong southerly wind and the entrance is altogether an exceedingly dangerous place.

Buoy.—A red conical buoy, marked "Harbor Island," is moored in a depth of 6 fathoms about ½ mile 220° from Harbor Islet.

Musquodoboit Harbor Range Lights, fixed red lights, elevated 19 and 59 feet, respectively, and visible 4 miles, are exhibited from white square wooden towers, 20 and 54 feet in height, respectively, with red roofs, situated at the entrance to Musquodoboit Inlet. The front light is erected on Shag Ledge, 1,250 yards 190° from the rear light which is located on French Point, northwestern extremity of Kent Island. Exhibited annually from April 1 to December 31.

Directions.—The most favorable time for a stranger to enter this inlet is at low water, when Duke Rocks and Bull Reef on either side of the entrance, as well as the mud flats on either side of the channel, become visible.

Vessels should enter by the channel to the eastward of Musquodoboit Ledges and Harbor Islet, avoiding Harbor Islet Shoals and Bull Reef, by keeping Jeddore Light astern and just seen over the saddle of Jeddore Head, bearing about 112°, until the range lights are bearing 10°, when they should be steered for, passing the buoys marking the shoal off Steering Beach.

From there on the channel is marked at the turns by red and black spar buoys.

Jeddore Head, about 5 miles eastward of Petpeswick Head, attains an elevation of 200 feet. On the western side of the head are cliffs of red clay 70 feet high, and on its southeastern side Jeddore Cliffs attain an elevation of 135 feet, and being also of red clay form an excellent landmark. Off the pitch of the point the 5-fathom curve extends ½ mile to the southwestward.

Jeddore Harbor.—Jeddore Harbor is the first good anchorage harbor eastward of Halifax.

Its entrance, which is 2¼ miles northeastward from Jeddore Head, is 850 yards wide from West Head to the opposite shore; but Thorn Shoal, with 1½ fathoms water on it, stretches out from the western shore just outside and across the entrance, so as to be greatly in the way of vessels entering. The channel between this shoal and East Head is 60 yards wide between the 3-fathom curve and carries a depth of 4 fathoms at low water over what may be termed the bar.

The eastern extremity of Thorn Shoal is marked by a black bell buoy; it should be left on the port hand entering.

Bar Point, on the eastern side of the harbor, and immediately within the entrance, is composed of shingle and inclosing a pond, and from it Bar Shoal, a continuation of the shingle of Bar Islet, extends more than halfway across to the western shore, diminishing the breadth of the channel to 200 yards, but forming no bar, the depth there being 6½ fathoms.

The western edge of Bar Shoal is marked by a red conical buoy, which should be left on the starboard hand entering. These buoys are replaced by spar buoys during the winter.

Anchorage.—The sandy beach of Marsh Point will be seen extending from the western shore 1½ miles within the entrance. The anchorage is secure within this beach in a depth of 7 fathoms, over mud, and in a channel 300 yards wide; but outside the bottom is of sand and a considerable swell rolls in with strong winds from the southward; nevertheless the coasting schooners anchor there in fine summer weather.

Inner Harbor.—The channel between flats of mud, weeds, and mussel beds, which dry at low water, continues clear and sufficiently deep for fairly large vessels to Bown Islands, off English Point, which separates the eastern and western arms of the harbor, 4 miles within the entrance. Anchorage can be obtained within or to the northwestward of these small islands; but the entrances to the arms are nearly closed by shoals, which leave only very narrow and intricate channels through which the depth is not more than 14 or 15 feet at low water.

For the navigation of these arms the mariner is referred to the chart, since no written description would avail; they are navigable nearly to their heads for any vessel that can enter them, including Salmon Inlet to the rapids at the entrance of Salmon River, which is 2 miles above the long wooden bridge which crosses the entrance of the inlet 1.5 miles up the Eastern Arm.

Jeddore Harbor Range Lights, fixed white lights, visible over a small arc of the range, are exhibited on the western side of the entrance southward of Marsh Point.

The front light is elevated 41 feet, visible 9 miles, and shown from a white square wooden tower 33 feet high.

The rear light is elevated 105 feet, visible 16 miles, and shown from a white square wooden tower 28 feet high. (See Light List.)

These lights (850 feet apart), in line 346°, lead very close eastward of the Old Man and across the shoal ground extending from it; this range also leads eastward of Thorn Shoal and into the entrance of the harbor. The red conical buoy at Bar Shoal shows where vessels should leave alignment and shape a course 22° 30′ up the stretch leading to Marsh Point. Northward of Marsh Point is anchorage.

Jeddore Rock.—Jeddore Rock, formed of clay slate and 50 feet high, is the westernmost small island off the mouth of the harbor, with a rocky ledge extending 300 yards from its western end. It lies about 1¾ miles 108° from Jeddore Head, the passage between being clear, with the exception of some patches of 5 and 6 fathoms water on which, however, the sea very rarely breaks.

Detached patches.—Several 5-fathom patches lie about 800 yards from the shore southward and southwestward of Jeddore Cliff; patches of 5¾ fathoms and 6 fathoms lie, respectively, 1,400 yards and 1¼ miles westward from Jeddore Rock Lighthouse.

Jeddore Rock Light, group occulting white, elevated 86 feet above high water, visible 15 miles, is exhibited from a square wooden lighthouse, 50 feet in height, painted white with two red horizontal bands, on the summit of the rock.

Fog signal.—A hand foghorn is sounded from Jeddore Rock Lighthouse.

Communication.—There is a telegraph station at Jeddore.

Population—Supplies.—The scattered population along the shores of Jeddore Harbor depend principally upon coasting, fishing, and lumbering for subsistence and could afford only a very limited supply of fresh provisions to shipping. Water may be obtained from a small stream near Blakely Cove on the western shore 3.5 miles within the entrance.

Arnold Rock, ½ mile 181° from Jeddore Rock, dries at low water, and can almost always be seen; but to insure passing westward of it, as well as of Arnold Shoal, with a depth of 6 fathoms, which lies ¾ mile farther off in the same direction, the harbor's mouth must be kept open westward of Jeddore Rock.

Old Man, Mehanny, and Gull Rocks.—Old Man is a small rock 12 feet high and lies with the center of Jeddore Rock in line with Jeddore Head, bearing 288°, distant about 1,400 yards. It is steep-to on the northeastern side, but a small sunken rock, with only ½ fathom water, lies 200 yards 193° from it.

Jeddore Head, seen open southward of Jeddore Rock, leads southwestward of Old Man; the passage is clear between it and Arnold and Jeddore Rocks.

There is also a clear passage between Old Man and Mehanny Rocks, some of which are dry at low water, and bear from Old Man 35°, distant ¾ mile. Beyond them in the same direction Gull Rock, together with Barren and Roger Islands, will be seen, the latter lying ½ mile offshore and ¾ mile eastward of the harbor's mouth.

Hopkin Rock has 2 fathoms over it and from it Old Man (with the breakers on Arnold Rock seen just open to the southward) bears 250°, distant 1¾ miles. Both this and Macdonald Rock are very small, with deep water all around them; they break only in heavy weather.

Macdonald Rock, with 2 fathoms over it, lies about 1¼ miles 249° from the southern point of Long Island; and from it the eastern head of Jeddore Harbor and western point of Barren Island, in line, are seen over the western Spritsail Rock, bearing 303°.

Pollocks, consisting of three distinct patches, are rocky fishing grounds, on which the sea breaks after heavy gales, but on which no depth less than 5½ fathoms has been found.

Inner Pollock, the largest of the three patches, is ½ mile long north-northwest and south-southeast, having a depth of 7 fathoms on its southern end, and the least water, 5½ fathoms, near its northern extremity.

From the shoalest spot, Jeddore Rock (in line with the northern extremity of Jeddore Cliff) bears 328°, distant 3 miles, and Egg Island 60°, distant 5¼ miles.

Outer Pollock has a depth of 6 fathoms, and lies nearly 1 mile farther off on the same line of bearing from Jeddore Rock, and with Egg Island bearing 51°, distant 5½ miles.

East Pollock is a small patch of 7 fathoms, with deep water around, lying about east-northeastward, ½ mile from the shoalest part of Innner Pollock.

Jeddore Cliff seen open westward of Jeddore Rock leads westward of the Pollocks. Jeddore Harbor Lights, in line bearing 346°, also lead clear westward of these shoals, and almost directly for Old Man Rock.

Jeddore Ledges comprise the whole of the scattered off-lying dangers to the southward of Jeddore Harbor, and in consequence of their distance from the coast and proximity to deep water require to be approached with extreme caution.

Southwest Ledges are three rocky patches which dry at low water and cover a space 600 yards long in a north-northeast, south-southwest direction. From the northeasternmost ledge the southern point of Long Island bears 7°, distant 1¼ miles, and the passage is clear between them. The southwesternmost ledge is covered only during spring tides, and can therefore almost always be seen.

Bull Rock, 1,200 yards 120° from the last-named danger, is one of the most dangerous of the ledges, having but ¾ fathom over it at low water; it is only marked by breakers during high tides when a heavy sea is running. From Bull rock, the southern end of Long Island bears 353°, distant 1¾ miles, and Egg Island 46°, distant 2 miles.

Bull Shoal, with 3 fathoms over it, lies ½ mile 232° from Bull Rock, and nearly 1,400 yards 165° from the southwesternmost of the Southwest Ledges. From it Old Man, Jeddore Rock, and Jeddore head are nearly in line, bearing 290°. It rarely breaks and is therefore extremely dangerous.

Brig Rock, with ½ fathom over it at low water, is usually marked by a breaker; during low spring tides and a heavy sea its top becomes visible between the waves. From Brig Rock, Egg Island bears 54°, distant 3¾ miles, and Old Man Rock, in line with the center of Jeddore Cliff, bears 308°, distant about 3 miles. This rock is most dangerous in fine weather, and at high water, when its position is not indicated by a breaker.

A red conical buoy is moored 500 yards 181° from Brig Rock. This buoy is kept in position all the year round if possible, but it may be necessary to remove it for a few weeks in the early spring if there is much drift ice in the vicinity.

Brig Shoal, with a depth of 5 fathoms, lies 800 yards 123° from Brig Rock; from it Bull Shoal, Bull Rock, and the southern side of Egg Island are nearly in line, bearing 49°. This shoal is dangerous after very heavy gales, when it is said to break at irregular intervals.

Clearing mark.—Old Man Rock, in line with the northern extremity of Jeddore Cliff, bearing 316°, leads 800 yards southwestward of Brig Rock and Shoal, and between them and East Pollock.

Tides.—At Arnold Cove, 2½ miles within the entrance of Jeddore Harbor, the high water interval is 30m.; mean range 5.2 feet, spring range 6.4 feet. The currents change almost immediately after high and low water and do not exceed a velocity of 2 knots an hour. In the entrance of the harbor the times will be a few minutes earlier, the rise 2 feet less, and the ordinary velocity of the streams 1 knot. The indraft of the flood tide is felt several miles off this harbor and off the inlets westward of it.

Directions.—Approaching the anchorage in Jeddore Harbor from the westward pass midway or nearly so between Jeddore Head and Jeddore Rock, steering 44° for George Point, with Wreck Cliff shut in a little behind but showing over it. When the steep bank (not the sand beach) of Marsh Point is in line with the shingle beach of Bar Point, bearing 357°, haul northward and steer in with the harbor lighthouses in range 346°.

Keep the rear lighthouse open a little westward of the front lighthouse on nearing and passing Bar Point Shoal, and when from 200 to 300 yards from the shingle beach on the western shore of the harbor steer along the shore to the northward and eastward at any distance between 100 and 200 yards until abreast the sand beach of Marsh Point, which must be rounded to the northward at the same distance, and anchor between it and Pea Point, on the opposite shore, in about 7 fathoms, over muddy bottom. At or near low water, when a part of the Bar Shoal is shown by the breakers and the steep mud flats are visible on either side of the channel, is the most favorable time for entering the harbor.

In approaching the harbor from the southward the harbor mouth should be seen between Old Man and Jeddore rocks, or the whole of Jeddore Cliff should be open westward of Jeddore Rock to pass westward of the Pollocks. Leaving Arnold and Jeddore rocks to the westward, pass midway between them and Old Man Rock, taking care to avoid the sunken rock off the latter; or, if preferred, pass eastward of Old Man Rock, keeping the rear lighthouse near Marsh Point open a little eastward of the front lighthouse, and when approaching the harbor's mouth bring the lighthouses in line and proceed as before directed.

In approaching Jeddore Harbor from the eastward coasting vessels pass inshore of Egg Island and between Long Island and Southwest Ledges, leaving the outermost ledges to the southward; but this passage should only be attempted by those who are possessed of local knowledge, for Macdonald and Hopkin Rocks lie nearly in the way and are the more dangerous because they seldom break. An additional reason why this inshore passage should be avoided is the fact that with southerly or easterly winds a dense fog frequently sets in very suddenly, and it would be perilous in the extreme for a stranger to be surprised by it among the ledges.

Vessels proceeding along this part of the coast should pass outside all the Jeddore Ledges, and at night or during foggy weather should not approach within the depth of 40 fathoms, for the soundings are deep and very irregular near them all. There are spaces with depths of 30 fathoms less than ½ mile to the southward of Brig Shoal and Outer Pollock.

Fishing grounds.—The following are rocky fishing grounds on which the sudden shoaling of the water causes at times a very heavy sea, but which are not otherwise dangerous:

John Bank, with 12 fathoms, lies 25 miles 154° from Egg Island.

Duck Bank, with a depth of 7 fathoms, lies 1.7 miles 174° from Egg Island.

Darby Bank lies 7 miles 118° from Shut In Island, the least water on the above banks being 14 fathoms.

A larger bank, on which the least water is 13 fathoms, lies 4 miles northeastward of Darby Bank.

Yankee Bank lies 6½ miles 131° from Shut In Island.

Clam Bay.—Immediately to the eastward of Jeddore Harbor are Roger and Barren Islands, which vessels may pass within or between in case of necessity, and which may afford shelter to fishing vessels in fine summer weather, but no safe anchorage for large vessels. Outside these islands are Gull and Mehanny Rocks and to the eastward of them Middle Rock, Spritsail, Sister, North Sister, and Siteman Rocks, Duck Island with its ledges, rocks, and shoals, and the Sugar Loaf and Goose Island with its ledges. These all lie across Clam Bay; and as they are out of the way of shipping, the mariner is referred to the chart for their relative positions. Long Island, which lies 4 miles 106° from East Head, Jeddore Harbor, may be easily distinguished. It is about ¾ mile long and 50 feet high.

Communication.—There is a telegraph station at Clam Bay.

Flint Ledge—Passage Rock.—Flint Ledge is about 10 feet above high water and lies 1,600 yards northward of Egg Island. Passage Rock, lying 1,400 yards northeastward of the lighthouse, has a depth of 4¾ fathoms.

The channel between Egg Island and Passage Rock is clear.

Between Flint Ledge and the southern point of Long Island are Tomfool Shoals, with 3 fathoms over them, and within these are Stoddart and Goose Ledges lying off the entrances of Clam and Little Harbors, which admit only small craft and boats.

Egg Island.—Composed of rock, is 300 yards in length and 40 feet in height, is the outermost of the numerous islands off this part of the coast, and lies 3¾ miles southwestward of Black Ledge, on the western side of the entrance to Owls Head Bay.

Egg Island Light, group flashing white, elevated 80 feet above high water, visible 15 miles, is exhibited from an octagonal wooden tower, 45 feet high, painted on the seaward side in black and white stripes, erected in the center of Egg Island.

Fog signal.—A hand foghorn is sounded.

Egg Island Light and Whistle Buoy, a red cylindrical buoy, marked "Egg Island" in white, surmounted by a pyramidal steel frame, supporting a lantern and whistle, and exhibiting an occulting red light is moored in 37 fathoms 5 miles 158° from Egg Island Lighthouse.

This buoy is kept in position all the year round if possible, but it may be necessary to remove it for a few weeks in the early spring if there is much drift ice in the vicinity. It is liable to be washed away.

Submarine bell buoy.—A submarine bell buoy is moored 400 feet northward of Egg Island Light and Whistle Buoy. The buoy is cylindrical and has dependent from it a submerged bell sounded at irregular intervals.

Pyche and Grizzle Rocks.—Outside Egg Island, about ¼ mile to the southward, are the Transport Ledges, always above water, and to the eastward of the island is the more dangerous Pyche Rock, with only 3 fathoms water; the latter lies with the southern extremities of Jeddore Rock and Egg Island in line, bearing 269° and is ¾ ile from Egg Island. Grizzle Rock, having 4 fathoms on it, lies with the northeastern points of Egg and Long Islands in line, bearing 304°, and is distant from the former island 1,100 yards.

Barse Rock and Hurley Shoal, on which the sea breaks during heavy gales, are small rocky patches with 4 fathoms on them and deep water all round. These shoals lie from Bald Rock nearly 2½ miles 170°, and 2¼ miles 148°, respectively, and are directly in the way of vessels proceeding along the coast.

Bald Rock, about 8 feet above high water, is of small extent, and lies 2½ miles 65° from Egg Island. It is bold on the northern and southern sides, but reefs extend eastward and westward of it to the distance of 250 yards, and there is a sunken rock, with only 1 fathom over it ¼ mile 238° from it. The passage is clear and 700 yards wide between Bald Rock and the shoal water off Bald Island, within which, and the other islands next eastward, there is a passage for small craft, but it is rendered dangerous by sunken rocks.

Owls Head Bay derives its name from Owls Head, which has a remarkable round mound and cliff at its extremity and is the most prominent point on the western shore of the bay, 1½ miles within the entrance. The bay, which is the western arm of Ship Harbor, is easy of access, never freezes, and the lighthouse on Egg Island, 4 miles to the southwestward, is an excellent mark from seaward.

Owls Head Light, occulting white, elevated 88 feet above high water, visible 15 miles, is exhibited from a square wooden dwelling, 38 feet high, painted white, with a red, octagonal, iron lantern rising from the middle of its hip roof, erected on the extremity of the head.

Fog signal.—A hand foghorn is sounded.

Owls Head Bell Buoy, painted black and white in vertical stripes, is moored 2½ miles 139° from the eastern extremity of Owls Head.

Owl Rock, with only 1½ fathoms water, is the principal danger which lies on the eastern side of the channel, 1,400 yards 299° from the southern point of Friar Island.

The eastern side of the peninsula of Wisdom Point (at the head of the bay) in line with Cable Point, 318°, leads clear 200 yards westward of Owl Rock, and also of the ledge which extends 600 yards southwestward from Friar Island, and which can almost always be seen.

The only dangers in the way are a rock, with 1½ fathoms water, lying northward, 300 yards from the eastern extremity of Black Ledge, and the reef running out 350 yards from Cuckold Island. Farther in the points are comparatively bold, and the bay free from hidden dangers.

The anchorage has the advantage of being open and free from ice all the winter. The best berth for a vessel of moderate draft is in a depth of 4 fathoms at low water springs, with good holding ground of sandy mud, with the eastern extremity of Shag Rock in line with Cable Point 112°.

Supplies.—Wood may be obtained anywhere around the bay, and water, fresh provisions, and a few vegetables from the settlement at Palmer Cove.

False Passage, between Nichol and Cable islands, on the eastern side of the bay, is only fit for boats or small craft, 3 feet being the greatest depth that can be carried through at low water.

Ship Harbor, situated 5 miles westward of Tangier Harbor, is nearly 5 miles in length, though the narrows, at the entrance, are barely ¼ mile across. The approaches to the harbor are comparatively bold and steep and lie between Charles and Nichol islands, formed of gneiss and barren; they are among the largest on the coast, but in no part do they exceed an elevation of 100 feet above the sea.

Although very narrow, the entrance to Ship Harbor is not difficult with a fair wind; within the harbor a large number of vessels may be moored in security.

The western shore is well settled, and so also is the eastern shore as far in as Salmon Point, for the hills of drift sand and clay, which attain an elevation of more than 200 feet, though abounding in bowlders, afford a sufficiency of hay and vegetables for the support of cattle and sheep.

The northeastern shore within Newcome Brook is barren, the hills being bare, and the extreme height 240 feet. Little River flows into the head of the harbor 5 miles from the entrance, and near it, on the western side, a larger and rapid stream discharges the waters of Ship Harbor Lake.

Caroline Island lies over on the western side of the harbor, 1 mile within Beach Point, and may be easily recognized by a round wooded hill, 190 feet high, near its northeastern point.

A Roman Catholic chapel stands on the western shore 1¼ miles within the entrance, and an English Episcopal church farther in on the same side.

The anchorage is midway between Salmon Point and the western shore in a depth of 7 fathoms or anywhere between Salmon Point and Whale Island in depths of from 4 to 6½ fathoms, the bottom being of mud and the shelter complete.

Supplies.—Ship Harbor has been long settled; several of the principal families own schooners employed in the coasting trade, which, together with lumbering and fishing, and the limited produce of their cattle and fields, furnish them with a comfortable subsistence. The best watering place is a rapid brook on the eastern shore about 1,800 yards within Salmon Point. Supplies of fresh provisions may be obtained.

Wolf Point Light, fixed white, elevated 87 feet above high water, visible 15 miles, is exhibited from a white square pyramidal tower, 35 feet high, with red lantern and dwelling attached, on Wolf Point, the northeast extremity of Nichol Island.

Fog signal.—A hand foghorn is sounded.

Tides.—The high water interval in Ship Harbor is 7h. 38m., mean range 5.3 feet, spring range 6.5 feet, but winds cause great irregularities both in the times and rise.

The ordinary velocity of the tidal currents does not exceed ½ knot an hour; but after heavy rains or the melting of winter snow, as well as after strong southeasterly gales, that have driven the water into the harbor, the ebb current is said to be much stronger.

Beacons.—Pole beacons, painted red, mark Black Rock, O'Brien Reef, the edge of the shoal water westward of Salmon Point, and White Rocks; similar beacons, painted black, mark Garret Ledge and the edge of shoals extending from the southwestern shore above Eisan Point.

Dangers on western side.—In approaching the harbor, the principal dangers lie outside the islands off its entrance. Friar Island and Friar Ledges lie on the western side and off them Flat Ledge always above water; West Bull Rock, with only 1 fathom water over it, 500 yards westward, and East Bull Rock, 4 fathoms 550 yards eastward of it.

Egg Island Lighthouse, seen over Bald Rock bearing 245°, leads about 800 yards to the southward of these dangers.

Middle Ground — Northeast Shoal — Pot Rock.— Middle Ground, with a depth of 4 fathoms, is 1,200 yards eastward from Flat Ledge. Northeast Shoal, with 2½ fathoms, is 900 yards northward of Middle Ground, and 1,500 yards from Bear Rock. These dangers lie southward of Nichol Island, and vessels approaching Ship Harbor should pass to the southward and eastward of them all. Farther in the rocks and shallow water off the eastern side of Nichol Island, including Pot Rock, 1,100 yards northward of Northeast Shoal, has 4 fathoms on it; northward of Pot Rock are the shoals extending from Nichol Island, which will be avoided by bearings of Wolf Point Lighthouse.

Dangers on eastern side of entrance—Bull Rock.—The principal dangers on the eastern side of the entrance of Ship Harbor are the ledges off Charles Island, the outermost being Bull Rock, covered with only ½ fathom water, which is often shown by a breaker 1,200 yards 122° from Charles Point.

Bull Rock Bell Buoy, painted in red and black horizontal bands, marked "Bull Rock" in white, is moored in 12 fathoms 700 yards 150° from the rock.

Bull Rock, together with numerous other rocks above and under water, will be cleared to the southward by keeping Long Point (the southern extremity of Nichol Island) open southward of Bear Rock, bearing 256°.

Bear Rock, which lies 1¼ miles westward of Bull Rock, is small, rises 4 feet above high water, and is quite bold on the eastern side; but a reef, mostly dry at low water, extends from it 300 yards to the westward. There is a clear channel, about ½ mile broad, into the harbor on either side.

Ship Rock (which gives its name to the harbor), situated 1¼ miles northeastward from Wolf Point Light, may be easily recognized, being a remarkable cliff of clay slate, 75 feet high, on one of the islands on the eastern side of the passage. When seen from a distance at sea the cliff resembles a ship under sail.

Ship Rock in line with the western point of Bald Island bearing 333° clears Bear Rock on the western side; and, Ship Rock and Tucker Point in line 322° clears Bear Rock on eastern side.

There are also several outlying dangers, on all of which the sea breaks occasionally after heavy gales, which are equally in the way of vessels proceeding along the coast, or approaching Ship Harbor, Shoal Bay, or Tangier Harbor, as follows:

Silver Shoal, with 5 fathoms 3¾ miles 123° from Charles Point, Broad Breaker, with 4 fathoms, about 1½ miles 147° from Charles Point, and Little Rock, with 4 fathoms water, about 2 miles 137° from Flat Ledge.

Ship Harbor Whistle Buoy, black, marked "Ship Harbor" in white, is moored, in a depth of 15 fathoms, about ½ mile southeastward of Little Rock.

Directions—From the westward.—Entering the harbor with the wind from the westward, proceed as follows: To clear the East and West Bulls, steer to the eastward with Egg Island Lighthouse and Bald Rock in range astern, 245°; outside Flat Ledge (which can always be seen) at the distance of 800 yards, till Ship Rock comes in range with the western point of Bald Island, bearing 333°, steer in on this range, between Northeast Shoal and the reef extending from Bear Rock. Having passed the latter, steer so as to pass midway between Wolf Point and Bald Island, and thence for the harbor mouth, as before directed.

From the eastward.—The channel to the eastward of Bear Rock is preferable, especially for sailing vessels working in, as the rock is steep-to on that side, and the range marks are reliable. Approaching Ship Harbor from the eastward with a fair wind, Bull Rock, and the other ledges off Charles Island, will be avoided by keeping Long Point open southward of Bear Rock bearing 256°; until Passage Island disappears behind Wolf Point, with the latter bearing 295°; then alter course as necessary to pass mid-channel to the harbor's mouth.

Day Cove.—The space between Nichol Island on the western side and the mainland is almost completely occupied by islands and shoals, which afford shelter to Day Cove, where secure anchorage for small vessels may be obtained in a depth of less than 4 fathoms, with the western islands just shut in behind Passage Island eastern point, in which position they will be out of the swell that rolls in after heavy southerly gales.

When abreast Passage Island, steer toward Lapstone Point to bring the house on Eisan Point in range with the northeast point of Caroline Island, seen over the small shingle islet off and nearly in range with the clay cliff of Salmon Point, bearing 313°. Keep these marks exactly in range, past Black Rock, until abreast of Black Point on the eastern side of the entrance, then alter course to pass between O'Brien Reef and Beach Point.

After passing between O'Brien Reef and Beach Point, of shingle (where the channel, between the 3-fathom curve on either side, is only 160 yards wide), steer for the anchorage.

If the wind should be unfavorable for running in, anchor outside in Day Cove.

Reference to the chart will show that shoals commence immediately within Salmon Point on the one side and Whale Island on the other; and that the channel becomes exceedingly intricate after passing Caroline Island and Mussel Island, which latter is on the eastern side and 2 miles within the entrance. There is a very narrow channel between Garret Ledge and White Rocks, with 3½ fathoms at low water, through into the clear part of the harbor within Eisan Point, where the depth is from 5 to 8¼ fathoms, with space sufficient for vessels to lie in safety.

Shoal Bay, the next inlet eastward of Ship Harbor, is sufficiently wide for large sailing vessels to work in and out with ease, and possesses a convenient depth of water and excellent anchorage.

There is a narrow and intricate channel of communication between Shoal Bay and Tangier Harbor, lying between the Inner Baltee Island and the mainland; there is also a passage within Tangier Island, but its dangers render it unavailable, especially for strangers.

Dangers.—Baltee Shoal, with 4¾ fathoms over it, 1,600 yards northwestward from Outer Island; Net Shoal, with 3 fathoms over it, 1 mile northwestward of Baltee Shoal; Eve Ledge, awash at high water and always visible and steep-to on its southwestern side; and Middle Ground, with 2¼ fathoms on it, 1,100 yards northwestward from the northern point of Charles Island. The dangers on the western side of the approach are the ledges off Charles Point and Borgle Shoal, having 2½ fathoms over it, 1,400 yards northward of Charles Point.

Anchorage.—The only secure anchorage for large vessels is on the southwestern side, near the head of the bay, with Borgle Bluff and Outer Island in range 111°; either midway between the Middle Ground and the northern point of Charles Island, in about 5 fathoms sand, 400 to 600 yards northward from Round Islet (in range with Tucker Point), or to the northwestward of Middle Ground in a depth of about 4 fathoms mud, with Harwood Island seen through The Tickle and bearing 228°, and Borgle Bluff and Outer Island apparently in range 111°, the latter berth being the more preferable of the two, although some swell may roll in during or after heavy southeast gales.

The coasting schooners anchor off Shellnut Cove in a depth of 3 or 3½ fathoms mud, with Mary Island in range with Borgle Bluff (the northeastern extremity of Charles Island) 149°.

Supplies.—The head of Shoal Bay is well settled, the hills of red clay affording a productive soil, but the islands are almost everywhere barren. Supplies of fresh provisions, wood, and water may be obtained.

Directions.—Approaching Shoal Bay from the eastward, round Outer Island at the distance of ½ mile or more, in order to avoid the reefs off it, and pass westward of Baltee Shoal by bringing Borgle Bluff to bear 305°.

Leave Net Shoal to the eastward by keeping the remarkable and highest of the red clay cliffs open to the westward of Mary Island, bearing 314°. The same range leads close to the southwestward of Eve Ledge.

Having passed between Eve Ledge and the northern point of Charles Island (where the channel is clear and nearly ½ mile wide), steer for either of the anchorages given above. If going to that northwestward of the Middle Ground that danger will be avoided, in passing between it and Mary Island, by not bringing Borgle Bluff to the eastward of 125° until the southern sides of Mary and Tuff Islands are in range, bearing 65° or until Hardwood Island appears through The Tickle.

From this position steer to the westward and anchor as already pointed out.

Tangier Harbor, next eastward of Shoal Bay, is separated from Pope Harbor on the east by a narrow peninsula about 2 miles long in a southeasterly direction. The western side of the channel is formed by Tangier and the two Baltee islands.

The entrance to Tangier Harbor is not easily recognized from seaward, as the land is low and devoid of any remarkable features, and Tangier Island partly fronts it. Between Tangier Island and Sandy Cove Point the distance is 900 yards, but the passage is narrowed to 500 yards by a small patch of 3 fathoms lying northward of the island.

Dangers.—On the eastern side of the entrance is the dangerous Horse Rock, with Pope Rock and Shoals, Drunken Dick, always showing, and Sandy Cove Shoal, with 2½ fathoms water over it.

Sandy Cove Point, in range with Hog Island Point, and with the eastern side of Tangier River, bearing 314°, leads clear of these shoals.

On the western side Mouseback Shoal extends to the southward ¼ mile from Outer Island, southeastward of Tangier Island. Dry Rock lies about 1,300 yards north-northwestward of Tangier Island. Farther northward, in the center of the harbor, about 800 yards northwest from Porcupine Point, is the rocky Whaleback Shoal, which only shows at low water springs; and 800 yards farther in is Shag Ledge, which dries at low water. The best channel is on the eastern side of the Whaleback Shoal and Shag Ledge.

Mason Cove, in the northeastern part of the harbor, 2½ miles from the entrance, is landlocked and has a depth of from 2 to 2½ fathoms over muddy bottom.

Anchorage.—The best and most secure berth is in Mason Cove, but a more roomy anchorage will be found eastward of the Shag Ledge, where the depths are from 3¼ to 4¼ fathoms, and the bottom in most places mud.

Directions.—In running for Tangier Harbor, which should only be done in clear weather, do not approach the shore nearer than 3 miles until the entrance is open, and Porcupine Hill on its eastern side bears 328°. Porcupine Hill and Sandy Cove point in range 331° just clear the 3-fathom edge of the shoals extending eastward from Tangier Island. Run in on this range, and with Sandy Cove Point bearing 317°; pass 200 yards from the point, and keep Ironbound Ledge in sight southward of it, to avoid Sandy Cove Shoal. Having passed the shoal, steer to bring the southern end of Sandy Cove Beach in line with Porcupine Point; then with these marks in line astern, steer 316°, which will just clear Whaleback Shoal, and 300 yards from Shag Ledge; when northward of Shag Ledge, a vessel may steer gradually round Hog Island Point, giving it a near berth, for Mason Cove anchorage, and come to anchor in 3¼ to 4¼ fathoms.

Communication.—There is a telegraph station at Tangier Harbor.

Supplies.—Around the head of Tangier Harbor, and also on the point of the mainland that separates it from Pope Harbor, there are tracts of fairly good pasture land, from which, together with fishing and coasting, the inhabitants derive a comfortable subsistence. Water may be obtained from Tangier River at the head of the harbor.

Pope Harbor has a depth of water sufficient for vessels of heavy draft, but it is only secure within Harbor Island, where the space with deep water being little more than 200 yards across it would be necessary to moor. In the bay outside a heavy swell rolls in during southerly gales.

Rock.—A small pinnacle rock, 30 yards across, with a depth of 7 feet over it, lies in the entrance about 900 yards northeastward of the eastern extremity of Ironbound Island.

Pope Harbor Light, fixed red, elevated 45 feet above high water, visible about 9 miles, is exhibited from a white square lighthouse, 37 feet in height, on the western point of Harbor Island.

The dangers on the eastern side of the harbor are few, and easily avoided; the western side of Phoenix Island is quite bold, and the channel, between it and Pope Shoals, is 800 yards wide, and has a depth of 73 feet; some part of the reef off Gerard Head, and of the Barrier Reef, can always be seen, and the shallow water does not extend from the dry parts more than 300 yards.

Horse Rock, the outer danger off Pope Harbor, has only ¾ fathom water; it lies 1½ miles 129° from Pope Rock in range with the eastern end of Ironbound Island.

A black can buoy, marked "Horse Rock" in white, is moored in 15 fathoms, 750 yards southeastward from the rock.

Pope Rock and Shoals.—Pope Rock, about 3 feet above high water is 1,600 yards southeastward of Ironbound Island. Pope

Shoals, which are exceedingly dangerous, extend from Pope Rock halfway across the channel in the direction of Pope Head and more than halfway out toward Horse Rock, the soundings between the

The tidal currents are weak and irregular.

Drunken Dick and Soup Rock lie between Pope Rock and Ironbound Island, making the passage between them impracticable for strangers, as also is the passage between Ironbound Island and the mainland.

Porcupine Hill, open westward of Ironbound Island, bearing 319°, clears these shoals to the westward.

Schooner and Black Rocks.—Schooner Rock, with only ¾ fathom water, lies 1¼ miles northward of Pope Rock and 600 yards from the islets at the entrance of Shelter Cove. Black Rock, always above water, lies 800 yards northward of Schooner Rock; the shallow water does not extend beyond 200 yards to the eastward from it, leaving a clear channel between it and the Barrier Reef of 400 yards.

Anchorage.—The anchorage is in 4½ fathoms mud between Bollong Point and the northern coast of Harbor Island.

The tidal currents are weak and irregular.

Directions.—When bound to Pope Harbor, and being to the southward of Horse Rock, pass to the eastward of the black buoy marking it, and bring the southeastern extremity of Bollong point in range with Gerard Head, bearing 318°, which will lead in between Phoenix Island and Pope Shoals. As soon as Pope and Taylor heads are in range, bearing 73°, alter course to bring the southwestern point of Harbor Island and Pope Harbor Light in range, bearing 323°, and having passed Schooner Rock, alter course for the head of the harbor, so as to pass midway between Harbor Island and Grum Point, until the channel through the harbor and to the northward of Gerard Island begins to open, when round Pope Harbor Light at a distance of about 300 yards and steer for the anchorage in 4½ fathoms mud midway between Bollong Point and the northeastern point of Harbor Island.

Should the wind be from the eastward a sailing vessel may anchor outside, in 6½ fathoms muddy water, with the southern points of Long Island in range, and may either wait for a fair wind or warp into the harbor.

Small vessels can pass to the eastward from this harbor through the narrow channel between Long and Gerard Island into a far more capacious and landlocked anchorage westward of Dutchtown Point.

Taylor Head is the extremity of a narrow peninsula upward of 3 miles in length, which separates Mushaboon and Spry harbors. It is destitute of trees, but, being composed of large white rocks, is distinguishable from some distance.

Spry Bay is situated immediately westward of Taylor Head and comparatively easy of access.

Redman Shoal, with a depth of 5 fathoms on it, is the outer danger in approaching Spry Bay; it is situated about 1½ miles 208° from Taylor Head.

Spry Bay Bell Buoy, red, marked "Spry Bay" in white, is moored as a fairway buoy, in a depth of about 15 fathoms, 1¾ miles 201° from Taylor Head.

Mad Moll Reef, the principal danger on the eastern side of Spry Bay, extends 1,600 yards west-southwestward from Taylor Head and from thence 1,600 yards in a northerly direction. On it there are two patches of shingle, which are always above water, and northward of them two rocky patches, which nearly dry at low water.

A red conical buoy, marked "Mad Moll" in white, is moored about 200 yards southwestward of Mad Moll Reef and 1,860 yards 227° from Taylor Head Observation Station.

Maloney Shoal has a depth of 2 fathoms on it; is on the western side of the entrance to Spry Bay.

The southern extremity of the dry shingle on Mad Moll Reef in range with Taylor Head, bearing 60°, leads ¼ mile southward of Maloney Shoal.

A black can buoy, marked "Maloney Shoal," is moored about 250 yards southeastward from Maloney Shoal.

Herring Shoal has a depth of 2¼ fathoms on it and is situated 1,400 yards westward of Maloney Shoal.

Maloney Rock, which is always above water, is 1,200 yards northward of Maloney Shoal.

Neverfail Shoal, with 2¾ fathoms, lies 500 yards eastward of Maloney Rock.

There are two rocky patches, with 4½ to 5 fathoms on them, lying 700 and 1,000 yards, respectively, northward of Neverfail Shoal; but there is seldom sufficient swell so far up the bay as to render these dangerous.

Ram Rock, which dries at low water, on the western side of Spry Bay, lies 300 yards eastward from Lawler Point, the eastern extremity of Gerard Island.

Bald Rock is ½ mile eastward of Ram Rock. There is a clear passage between Bald and Ram Rocks.

Spry Bay Range Lights, fixed white, in line 337°, lead in between Maloney Rock and Neverfail Shoal, westward of Bald Rock.

The front light, elevated 74 feet above high water and visible 14 miles in the line of range, is exhibited from a white square wooden tower 27 feet high, erected in about the middle of the southern side of Tomlees Head.

The rear light, elevated 110 feet above high water and visible 16 miles, is exhibited from a black square skeleton steel tower, the upper portion facing the alignment covered with white slats, 48 feet high, 312 yards 337° from the front light.

A light of 25 candlepower is shown over Spry Harbor from the front lighthouse.

Spry Harbor, situated at the northwestern end of Spry Bay, is sufficiently commodious to accommodate a large number of vessels.

Shoal.—There is a rocky shoal, with 3 fathoms on it, 300 yards off the western shore, and 550 yards northward of Dutchtown Point.

Anchorage.—The anchorage is in a depth of 6½ to 8 fathoms, mud, about 800 to 1,000 yards northeastward of Dutchtown Point, but there is plenty of available room to the northward and westward in the harbor, the anchorage being quite secure as long as Mad Moll Reef is not seen open eastward of Gerard Island.

Tomlees Bay, at the northeastern angle of Spry Bay, is open to the southward; it is almost full of rocks, which, together with the islets off its mouth, afford shelter to fishing vessels near its head, where there is a wharf and store.

Taylor Bay, on the western side of Tomlees Head, is a shallow indentation on the northern side of Spry Harbor; it is not adapted for large vessels, but affords secure anchorage for coasting and fishing vessels.

Supplies.—The shores of Pope and Spry harbors, as well as Taylor Bay, are more thickly peopled than usual on this coast; the hills of drift clay and bowlders on the mainland and also on the northern side of Gerard Island being cultivated to a considerable extent. There are extensive tracts of hardwood land in the vicinity, furnishing timber for shipbuilding. Supplies of fresh provisions and water may be readily obtained.

Directions for western channel.—The western channel into Spry Bay lies to the westward of Maloney Shoal and Maloney Rock, between them and Stoney Island, and is only 300 yards wide. The marks leading through it are the western edge of Bald Rock and the eastern side of Tomlees Head in range 356°.

Eastern channel.—Proceeding into Spry Bay by the eastern and preferable channel, pass westward of Redman Shoal and Mad Moll Reef, and between the latter and Neverfail Shoal, by keeping the eastern side of Tomlees Head, only just shut in behind, and seen over, the high bank on the eastern side of Leslie Island, bearing 338°. Steer on this range until Maloney Rock and Pope Head are in range, bearing 236°; then alter course to pass between Bald and Ram Rocks, then around the northern end of Gerard Island, at a distance of about 400 yards, and anchor in the anchorage already described. There is a channel for vessels between Dutchtown Point and Gerard Island into a landlocked anchorage to the westward, but it is obstructed by a shoal of ¼ fathom.

Spry Bay Range Lights on Tomlees Head in line 337° lead between Neverfail Shoal and Maloney Rock.

Mushaboon Harbor scarcely deserves to be ranked as a harbor, as it is exposed to the full force of southeast winds. It only affords indifferent shelter to vessels on the eastern side near its head, where Gull Rock and the shoals, which nearly unite it to Malagash Island, break off the sea.

Mushaboon Harbor Light, fixed white, elevated 28 feet above high water, visible 6 miles, is exhibited from a white wooden pole 25 feet high with a shed at base erected on Gull Rock.

A small wooden building, 12 feet by 16 feet, painted white, stands 125 feet eastward of the light.

The Gates.—The dangers off Mushaboon Harbor are common to it and to Sheet Harbor, with which it communicates by a narrow and intricate passage, termed The Gates, between Malagash and Gibbs Islands. In the entrance of this passage there are three small islets, and the channel, which is on their northern side, is not more than 80 yards wide; a depth of 12 or 14 feet is all that can be carried through at low water, and that with difficulty.

Directions.—As the harbors immediately adjoining Mushaboon to the eastward and westward are so superior to it, vessels seldom require to enter this exposed anchorage, but should any wish to do so the safest course for a stranger to pursue will be to steer, with either of the range marks for Sheet Harbor in range, until Bob Bluff is seen well open northward of Pyche Island, bearing 305°. Thence steer for the bluff on this bearing, which will lead well to the northeastward of the Pyche Shoals, and vessels may run up the middle of the bay, steering 311°, for Yellow Rock, between Shag Rock, lying 400 yards northward of Pyche Island, and Ship Reef, having ½ fathom least water at its extremity, which extends 600 yards westward from Salisbury Island; the channel between the dangers on either side is ½ mile wide. Bob Bluff must be given a berth of 600 yards in passing to avoid Bob Shoal, with 1½ fathoms, which lies nearly 400 yards to the northeastward of it.

On nearing Gull and Yellow Rocks a vessel may either pass between them, disregarding the rock with 4 fathoms at low water, which lies in mid-channel, or, passing westward of Yellow Rock, may then steer to the eastward toward Botelier Island and anchor off it, northward of Gull Rock, in 6 fathoms, mud.

Sheet Harbor is one of the finest harbors on the coast and nearly midway between Halifax and Country Harbor. The entrance between Western and Danberry Islands is about 700 yards wide, and the anchorage immediately within it, on the western side, is quite safe and sufficiently commodious to accommodate a large number of vessels.

The harbor is of considerable extent, extending inland northward 6½ miles, and is navigable for vessels nearly to its head, where rapid streams discharge into it the waters of a chain of lakes. There are mills at the head of the Northwest and principal arm, the shores of which are well settled. There is also a scanty population along the Northeast Arm and eastern shore of the harbor; but the western shore, from Mitchell Point to Mushaboon Harbor, is uninhabited. The hills of clay abounding in bowlders supply the only soil adapted for cultivation. They rest on clay slate in nearly vertical strata, as is well displayed in the Northeast Arm, which in the course of time has been cut by the rapid stream at its head across the rock in nearly an eastern and western direction.

The population (about 1,500) is engaged in lumbering, gold mining, fishing, and farming.

Communication.—There is a telegraph station at Sheet Harbor and communication by steamers to Halifax.

Supplies.—Water may be obtained in Sheet Harbor, either from Watering Cove on the western side, or Smelt Brook on the opposite shore. A moderate supply of fresh provisions and abundance of firewood may also be procured.

Sheet Rock, a small islet, 45 feet high, at the entrance to the harbor, has a remarkable cliff of clay slate resembling a suspended sheet, from which the harbor derives its name; there is a rock 100 yards from its western end.

Sheet Rock Light, occulting white, elevated 75 feet above high water, visible 10 miles, is exhibited from a white square wooden lighthouse, 41 feet in height, on Sheet Rock.

A hand foghorn is sounded. (See Light List.)

Sheet Harbor Light and Whistle Buoy, cylindrical, painted black and white in vertical stripes, surmounted by a pyramidal steel frame, supporting a whistle and lantern, exhibiting an occulting white light, is moored in a depth of 24 fathoms, in the approach to Sheet Harbor, 5¼ miles 175° from Sheet Rock Lighthouse.

Sheet Harbor Passage Bell Buoy, painted in black and white vertical stripes, and marked "Sheet Harbor Passage," is moored in 10 fathoms 1 mile 115° from Fishery Point.

Sheet Harbor—Passage Range Lights.—The front light, fixed white, visible 12 miles, is exhibited 51 feet above high water from an inclosed white wooden tower 27 feet high, erected about 800 yards eastward of Kirby River, eastern end of the passage to Sheet Harbor.

The rear light, fixed white, visible 14 miles on the line of range, is exhibited 75 feet above high water from an inclosed white wooden tower 27 feet high, erected 381 yards 344° from the front light.

Directions.—The lights in line lead in, westward of Eastern Shagroost, past the eastern end of Fishery Point Shoal, thence between Perry Shoal and Hardwood Island.

Dangers off the entrance.—The numerous and formidable dangers off Sheet Harbor render the approach to it extremely dangerous during dark nights, or the prevalent foggy weather, especially for large vessels; but by day, with clear weather, little difficulty will be experienced in a vessel furnished with charts and directions, the range marks being distinct and good.

Shoals.—A shoal having a depth of 20 feet over bowlders, 30 yards in extent, lies within the 4-fathom curve, 350 yards 124° from the southwestern end of the island (50 feet) northeastward of Malagash Island. A shoal having a depth of 21 feet over bowlders, 30 yards in extent, lies within the 4-fathom curve, 600 yards 117° from the southeastern point of Horse Island.

Pyche Shoals.—The dangers on the western side of the entrance to Sheet Harbor are rocky patches of 3½ and 4 fathoms off Taylor Head, and also the more dangerous Pyche Shoals, which are separated from Pyche Island by a narrow channel leading to the entrance of Mushaboon Harbor. The least water on these shoals 2¾ fathoms and their southeast point, about 1 mile from the island, is cleared by the eastern points of Guilford and Western Islands in range bearing 11°.

Mushaboon Shoal, a small rocky patch of 3 fathoms, lies 1½ miles 110° from Taylor Head. As the position of this rock is seldom shown by a breaker, it is exceedingly dangerous and would be more so but that its locality is in some measure pointed out by Taylor Goose Rock, which can always be seen and from which Mushaboon Shoal bears 12°, about ¾ mile.

Taylor Goose.—This dangerous rock, awash at high water, lies about 1¾ mile 134° from Taylor Head. There is sufficient depth for vessels to pass southeast of it at the distance of 200 yards, but in the opposite direction the shoal extends ¼ mile, and is just cleared on the northwestern side by the eastern points of Guilford and Western Islands in range 11°.

Yankee Jack, a small rocky shoal covered only with ½ fathom, lies 2½ miles 126° from Taylor Head. At the distance of ¼ mile 269° there is another rock with 2 fathoms water. These are dangerous, especially at high water and a smooth sea, when they are not marked by breakers; but Taylor Goose Rock, which can always be seen, and from which the 2-fathom rock lies ½ mile 118°, serves as a beacon to avoid them. The eastern extremities of Danberry Island and Sheet Rock in range 11°, lead nearly midway between Taylor Goose and the 2-fathom rock. No dangers have been found to the southward of these shoals, but there are several patches with a depth of 8 fathoms, the outermost of which is on Pollock Ground.

Geddes Shoal, with 5 fathoms on it, is the outermost of the offlying patches on the eastern side of the entrance to Sheet Harbor. From it the eastern extremity of Western Shagroost is in range with Fishery Point, bearing 2°, distant about 2¼ miles; and Sheet Rock appears in the entrance of the harbor, between Western and Danberry Islands, bearing 338°, distant about 4¾ miles. The sea breaks over this rocky shoal only after heavy gales.

Logan Rock, with 3¼ fathoms, lies ¾ mile 322° from Geddes Shoal. From this dangerous rock, which is seldom marked by a breaker, Yankee Jack (on the western side of the channel) bears 263°, the passage between them being about 1¼ miles in width.

Monroe Rock, with 2 fathoms, lies with the western point of Western Shagroost and Sheet Rock Lighthouse in range, bearing 322°, the former being distant nearly 1 mile. Pumpkin and Horse Islands apparently in range, bearing 37°, leads ¼ mile southward of this rock and close to the southward of Geddes Shoal.

Western Shagroost, 6 feet above high water, can always be seen. A reef partially dry extends about ½ mile from it southwestward and has only ½ fathom on its southwest extremity. To the northward of the rock are several rocky 4-fathom patches, as well as the dangerous Babin Shoal, the least water on which, 2½ fathoms, bears from Western Shagroost 313°, distant 1¼ miles, and from Fishery Point (nearly in range with the southern extremities of Hardwood and Mink Island, bearing 223°, distant 1½ miles.

Eastern Shagroost is a low rocky ledge 5 feet above high water, with breaking rocky shoals on its northern and western sides, but steep-to on its southern side and with deep water between it and Pumpkin Island, from which it is about 1½ miles 235°.

Pumpkin Island, a steep rounded islet 90 feet high, bare of trees, lies 1¾ miles westward from the lighthouse on Beaver Island; rocky ledges extend to the southward nearly ½ mile from its southern point.

Macdonald Rock and Shoals.—Macdonald Rock, dry at low water, lies 1,200 yards, 206° from Macdonald Point, and on the extensive Macdonald Shoals, the outermost patch of which, with 2 fathoms, lies ¾ mile 223° from the point. The mark, which just clears the western extremities of Macdonald and Babin Shoals, as well as the reef off Western Shagroost, is Sheet Rock, in range with the eastern point of Western Island, bearing 332° 30′.

This range leads between Macdonald Shoals and a patch with 4½ fathoms water, and from the latter Sheet Rock appears in range with the western point of Danberry Island, bearing 354°, and is distant nearly 1 mile. There is also another rocky shoal with 5 fathoms water nearly 1 mile 263°, from Babin Shoal, and 1,800 yards 134° from the eastern point of Guilford Island. Both these shoals, which would be dangerous to large vessels in a heavy sea, will be cleared by attention to the directions which follow.

Anchorage.—The outer anchorage is in about 40 feet, mud, about 400 to 600 yards northward of the Western Islands.

Hurd Cove.—On the eastern side of Sheet Harbor, about 1½ miles within the entrance, is Gull Ledge, composed of shingle and situated off Hurd Cove, which leads into a narrow and intricate passage between Sober Island and the mainland, through which a depth of 6 or 7 feet only can be carried at low water.

Tides.—The high water interval in Watering Cove, Sheet Harbor, is 7h. 50m. mean range 5.4 feet, spring range 6.5 feet, but strong winds cause great irregularities, especially in the rise. The diurnal inequality is most distinctly shown in the low waters in this and all the harbors that have been surveyed on this coast, including Halifax. The ordinary velocity of the tidal currents does not exceed ½ knot an hour, but it is said to be stronger after heavy rains or the melting of the winter's snow or after long continued southerly gales which have previously forced the water into the harbor. It is high water about one-fourth of an hour earlier in the entrance of the harbor, where the rise is about 2 feet less.

Directions—Western Passage.—Proceeding for Sheet Harbor by the westernmost passage westward of Taylor Goose and Mushaboon Shoals, and between them and Pyche Shoals, bring the western end of Sheet Rock to apparently in range with the eastern point of Danberry Island, bearing 20°, and steer with this mark in range until Bob Bluff opens out northward of Pyche Island, when Pyche Shoals will have been passed, and the vessel may be kept a little to the eastward so as to give a wider berth to the reefs off Guilford Island, which the above marks only just clear.

Passage eastward of Taylor Goose.—If it be desired to pass eastward of Taylor Goose and Mushaboon Shoals, and between them and Yankee Jack Shoal, steer with the eastern extremities of Sheet Rock and Danbury Island in range bearing 11°; this range will lead midway between Taylor Goose and the 2-fathom rock, and clear of all danger to Sheet Rock, which may be passed on either side.

Middle Passage.—To pass between Yankee Jack and Logan Rock, which is the widest passage, steer with the eastern end of Sheet Rock apparently in range with the western point of Danberry Island, bearing 354° until the southwestern point of Guilford Island bears 300°, when the southern point of Salisbury Island will have disappeared behind it; then steer to the northward and westward until the western ends of Danberry Island and Sheet Rock are in range 4°, in order to clear the 4½ fathom shoal, which the former range leads over, and pass to the westward of Sheet Rock.

Eastern Passage.—To pass eastward of Geddes Shoal and Logan Rock, and between them and the reef off Western Shagroost, steer with the eastern extremity Western Islands apparently just in range with the western end of Sheet Rock, bearing 332° 30′.

This range will also lead close to, but clear of, Babin and Macdonald Shoals, and up to Sheet Rock; but as the soundings are more than usually irregular by this route, it will be preferable on approaching Babin Shoal to steer toward Guilford Island on a 294° bearing until the western ends of Danberry Island and Sheet Rock are in range 6°. From this position the passage is clear to the entrance of the harbor; it being only necessary to keep to the eastward of the line joining the eastern points of Guilford and Western Islands, and to avoid a rock 100 yards distant from the western end of Sheet Rock.

In entering between Western and Danberry Islands, give the former a berth of not less than 200 yards to avoid a rock with ½ fathom, lying 100 yards off its eastern point, having passed which, steer along the northern side of the Western Islands at a distance of 400 yards until Macdonald Point is shut in behind Western Island and anchor in 6 or 7 fathoms, mud, not less than 300 yards offshore.

White Rock dries at low water and is situated 900 yards northward of Danberry Island.

Directions.—If a vessel intends to proceed up Sheet Harbor keep the western point of Danberry Island apparently in range with Sheet Rock, bearing 174°, which just clears westward of White Rock. Sheet Rock should therefore be kept open to the westward of Danberry Island until past this rock; then steer to the eastward, so as to bring the western points of Danberry Island and Sheet Rock in range, bearing 184°, and steer 4°, or so as to keep those marks in range astern, until nearly abreast Slab Point, on the western shore, 2 miles within the entrance. Then, as those marks barely clear Slab Shoal, steer a little to the eastward until it is passed, observing that the passage is only 400 yards wide between it and the reef, which extends 300 yards from Salmon Island.

Having passed Slab Shoal, keep toward the western shore, rounding Olding Point at a distance not exceeding 300 yards to avoid the shoal off the shingle of Watt Point, and anchor off Watering Cove on the western shore in a depth of 7 fathoms, mud, with the chapel at the head of the Northwest Arm appearing nearly midway between Mitchell and Church points. The vessel will here be landlocked and secure in all winds.

Watt Point Light, fixed white, elevated 23 feet above high water, visible 9 miles, is exhibited from a pole 18 feet high with a white wooden shed at its base, erected on Watt Point.

Church Point Light, fixed white, elevated 23 feet above high water, visible 2 miles, is exhibited from a pole 18 feet high with a white wooden shed at its base, erected on Church Point.

Pilot.—For the navigation of the arms, the services of a pilot are indispensable.

Beaver Island.—Beaver Island, 40 feet high, is partially covered with scrubby trees, and its slate cliffs show white to seaward. On its northern side in moderate weather landing can be safely effected at a small cove near the eastern end, and in bad weather boats may be saved, at high water, by entering the gully which separates the two parts of the island.

Buoy.—A black can buoy is moored in a depth of 7 fathoms, about 800 yards eastward of East Beaver Island, to mark the shoal projecting from the island.

East Beaver Island Light, revolving white, elevated 70 feet above high water, visible 12 miles, is exhibited from a lantern on the roof of a lighthouse, 35 feet in height, painted white, with three vertical red stripes on the gable facing south-southwestward, erected on the southeastern end of the island.

A diaphone horn is sounded.

Channel.—There is a channel passing close to the northern side of Beaver, Brother, and Pumpkin Islands, which is often used; but to navigate it safely care must be taken when to the westward of Pumpkin Island to keep the bearing of East Beaver Island Lighthouse in the hollow between the wooded Brother Islands, bearing 87°, so as to clear the Black Peg Shoals.

Beaver Harbor.—Notwithstanding the numerous dangers which fringe the coast in the vicinity of this harbor, it is easy of access after East Beaver Island Lighthouse has been identified, the entrance channel being straight and deep after passing about ½ mile eastward of Beaver Islands. The position of this harbor is objectionable during heavy south-southeasterly winds, but under all other circumstances it affords an excellent refuge.

Beaver Point Light, fixed white, elevated 49 feet above high water, visible 12 miles, is exhibited from a lantern on a white square dwelling 38 feet in height on the eastern end of Beaver Point.

Salmon River falls into the head of Beaver Harbor and at the bridge affords good fresh water.

There is a telegraph station at Salmon River.

Settlement.—The inhabitants along the shores of Beaver Harbor reside principally at the cove on its western side and at Salmon

River, some being engaged in the coasting trade, others in fishing and the cultivation of small farms.

Supplies.—Firewood and a limited supply of fresh provisions may be generally obtained.

Pumpkin Island, a steep rounded islet, 90 feet high, bare of trees, lies 1¾ miles westward from East Beaver Island Lighthouse; rocky ledges extend ½ mile south-southwestward from its southern point.

Cove.—There is a small cove situated 1 mile north-northwestward from Beaver Point. It affords good shelter, being protected by a reef of stones, partly dry at low water, spring tides, and by a spit of sand and shingle extending halfway across its entrance, within which small vessels may lie secure from all winds.

This cove may be entered by rounding the reef of stones above mentioned, which will be cleared by keeping Quoddy Hill, 184 feet high, and the southern point of Hardwood Island in range, bearing 83°, until the hill on Beaver Point (190 feet) is in range with the stores at end of the small spit, when steer in with this latter mark, bearing 160°, and rounding the spit, which is bold-to, anchor in 3 fathoms muddy bottom.

Macleod Cove also affords excellent anchorage in 3¼ to 4 fathoms, muddy bottom, and is entered by a channel 100 yards wide, with a depth of 3¼ fathoms in it, at the western end of Macleod Island. The anchorage is on the northern side of the island after rounding a spit of sand and mud extending 100 yards north-northwestward from its northwestern end.

William Shoal, with 3 fathoms water, and only breaking occasionally, is the principal danger to be avoided in approaching East Beaver Island Lighthouse, which bears from it 316°, distant 2 miles. It will be cleared, when nearing it from the southward by keeping the conical hill on Sutherland Island open eastward of Beaver Island, bearing 313°. The lighthouse in range with the hill leads directly over the shallowest part.

Beaver Harbor Bell Buoy,painted in black and white vertical stripes, is moored in 30 fathoms ½ mile southeastward of William Shoal and 2½ miles 132° from East Beaver Island Lighthouse. From the buoy a 324° course leads just eastward of the black can buoy off the eastern extremity of East Beaver Island.

Horse Shoal is a rock with 5½ fathoms over it 1½ miles northwestward of William Shoal and lies in the middle of the passage between it and Beaver Islands.

Hard Shoal is a rock with 5½ fathoms over it, situated 2½ miles 75° from East Beaver Island Lighthouse.

Marmot Rock, about 1¼ miles north-northwestward of Hard Shoal, is only awash at low water, spring tides, and lies so much within the line of the Beaver Islands that with the prevalent southwest winds it seldom breaks.

Pumpkin Island Summit in range 263° with East Beaver Island Lighthouse will lead 700 yards southward of Hard Shoal and 1¼ miles southward of Marmot Rock.

Middle Shoal, on the eastern side of the channel into Beaver Harbor, has 2½ fathoms water on it, and with the two neighboring 4-fathom rocky patches lying to the southward and northwestward may be avoided by not opening Harbor Rock to the westward of Rocky Island.

Harbor Rock, in range with the western end of Rocky Island, leads across the above-mentioned northwestern patch in a depth of about 4¼ fathoms, and if continued passes over a rocky patch of about 5 fathoms at the distance of 1,100 yards southeastward of Harbor Rock.

Sutherland Island, on the western side of the channel into Beaver Harbor, is wooded, with cliffs of slate, and has on it a conical-shaped hill 107 feet high, sufficiently remarkable to make a good mark for William Shoal.

Harbor Rock, 12 feet high, composed of bare slate, lies on the eastern side of the channel into Beaver Harbor and has shoal water extending 200 yards to the westward.

A red conical buoy, with "Harbor Rock" in white letters on the side, is moored in 7 fathoms of water 100 yards westward of the shoal extending westward from Harbor Rock.

Sandy Islet has a red clay bank 12 feet high at its southern end, from which a shoal, having about 2 fathoms, extends 500 yards in a southeasterly direction; between it and Harbor Rock the ground is broken and rocky, with two patches of 3 and 3¼ fathoms.

Rocky and Hardwood Islands lie on each side of the entrance to Salmon River Anchorage. The former has a rock, with ¾ fathoms, lying 250 yards from its eastern end; the latter is bold-to on its western side and has red clay banks.

Hardwood Island Light, fixed red, visible 6 miles, is exhibited 25 feet above high water, from a white wooden pole 23 feet high, with shed at base; erected on the shingle beach at the northwestern end of Hardwood Island.

Salmon River Anchorage—Balcom Shoal, with about 2 fathoms, lies in the middle of the passage between Rocky and Hardwood Islands, and narrows the available channel into Salmon River Anchorage to less than 200 yards.

There are two passages into Salmon River Anchorage, one northward of Rocky Island, narrow, but clear of rocks; the other, more commonly used, between Rocky and Hardwood Islands, for which the following brief directions may suffice:

In nearing Beaver Point, when the church steeple on the eastern side of Salmon River appears open westward of Hardwood Island, steer for it until Harbor Rock is in range with the western side of Sandy Island, when alter course with this latter mark in range astern, steering in 332° till Quoddy Hill (184 feet) appears well open northward of Hardwood Island; then having passed the shoals, steer for the steeple again, and anchor in a depth of 4½ fathoms, mud, when Sandy Island is shut in behind Hardwood Island.

Anchorages.—Anchorage is not good until northward of Beaver Point. Fair anchorage can be obtained in 7 fathoms, mud, about 800 yards westward of Rocky Island, and excellent anchorage in 3½ fathoms, mud, in Macleod Cove, 300 yards off the northern side of the island. Fishing boats anchor in 3 fathoms, mud, in a small cove 2 miles north-northwestward of Beaver Point.

Quoddy Inlet, an inlet to the eastward of Beaver Harbor, will admit schooners of small tonnage; but is not much frequented, even by small vessels, on account of the numerous rocky islets and shoals overlying its entrance.

Directions.—In approaching Beaver Harbor from the southward by day, when about 5 or 6 miles from Beaver Islands steer to bring Sutherland Island Hill open eastward of Beaver Islands bearing 313°. After passing the bell buoy and William Shoal alter course to pass outside the black buoy eastward of East Beaver Island, then steer to pass mid-channel between Middle Shoal on the east, Horse and Sutherland Islands on the west. After passing from about 200 to 400 yards to the eastward of Sutherland Island and Beaver Point, keep East Beaver Island Lighthouse in sight astern, open eastward of Sutherland Island, bearing 141°; on this range with Quoddy Hill (184 feet) in range with the southern end of Hardwood Island, bearing 84°, fair anchorage can be obtained in a depth of 7 fathoms, muddy bottom.

If, however, better shelter be desired, a pilot should be procured, and the vessel run into Salmon River Anchorage or Macleod Cove.

With an offshore wind a vessel must tack upon the two range marks binding the eastern and western sides of the channel, namely, Harbor Rock and western end of Rocky Island, and Beaver Point open of the eastern end of Sutherland Island. The anchorage is not good until the vessel is northward of Beaver Point.

At night.—The entrance to Beaver Harbor may be safely attempted, even at night, in clear moonlight weather, with a fair wind and careful attention to the bearing of East Beaver Island Light. Having passed not nearer than ½ mile to the eastward of Beaver Islands with the light on Beaver Point open eastward of Sutherland Island, steer in 314°, and approaching Sutherland Island, which will be recognized by its wooded hill, pass 200 to 400 yards to the eastward of it. After passing this island keep East Beaver Island Light in sight astern, open eastward of Sutherland Island, bearing 141°; and, steering with that mark astern, pass Beaver Point and anchor when abreast the cove in 7 to 8 fathoms, mud.

Bay of Islands is the name commonly given to the coast between Beaver and Marie Joseph Harbors. The islands off this part of the coast are very numerous, and the channels between them are so narrow, intricate, and beset with rocks that, although there is sufficient depth to admit schooners drawing 12 feet water, they are not easily described, and their safe navigation requires an intimate local knowledge, such as could never be acquired from the best chart. Coasters use them occasionally to avoid the heavy swell in the offing; a few know the channels sufficiently well to run inside the Islands the whole distance between Sheet and Liscomb Harbors, while others are content to venture within a few of the most off-lying of the numerous islands with which this part of the coast is studded.

There is a channel passing close to the northern side of Beaver, Brother, and Pumpkin islands which is often used, but to navigate it safely care must be taken, when to the westward of Pumpkin Island, to keep East Beaver Island Lighthouse in the hollow between the wooded Brother Islands, bearing 88°, so as to clear Black Peg Shoals.

Turner Island Approach—Buoys.—The following wooden spar buoys are moored, to mark the channel leading to Turner Island Government Wharf:

A red buoy marks Seal Rocks, 440 yards 219° from the southern point of Calf Island.

A red buoy marks the shoal extending southwestward from Calf Island, about 83 yards 244° from the southern point of Calf Island.

A black buoy marks Beyzan Rock, 400 yards 183° from the southeastern point of Turner Island.

White Island Bay, the outlet of Moser River, a small stream admitting schooners of light draft, is the abode of a few industrious families who cultivate small farms, and during the summer months frequent Halibut and White Islands for the purpose of fishing.

Bassoon Reefs, an extensive cluster of shoals lying 2.5 miles southwestward of Halibut Island, are composed of large rounded stones, partially uncovered at low water. They generally break heavily; but as at high water, springs, with the wind offshore, their position is not easily recognized, it will be well to take care that Pumpkin Island does not show open northward of Brother Island.

The northern sides of Pumpkin Island and Brother Island in range 280° lead 1,200 yards southward of the reefs.

Bassoon Reef Bell Buoy.—A black bell buoy marked "Bassoon Reef" in white letters, is moored in a depth of 24 fathoms, 1,500 yards 113°, from the southern extremity of the southeastern reef.

Chapel Shoal, a small rocky patch, with 6 fathoms, is situated about 1 mile southward of the southern end of Bassoon Reefs.

Snapper Shoal.—Snapper Shoal, with 4¼ fathoms least water on it, lies 1 mile eastward of the middle part of Bassoon Reefs.

Kitts Reef is 2¼ miles northward of Snapper Shoal; it is about 200 yards in extent, and has less than 1 fathom on it.

Bird Islands, 15 feet high and without trees, lie 1½ miles to the northwestward of Bassoon Reefs.

Halibut Islands, marking the entrance into White Island Bay, are a cluster of islands 1 mile in extent, the southernmost being 35 feet high; they lie to the northwestward of the White Islands, and are situated on the eastern side of a channel of deep water, leading into an indifferent anchorage under the shelter of Brokenback Island.

Salamander Rock, with only 1 foot on it at low water, lies about ½ mile 259° from the northernmost Halibut Island.

A red spar buoy is moored, in 5 fathoms of water, on the western side of Salamander Rock.

Pollock Shoal, with 2¾ fathoms water, is situated about ½ mile to the southward of the western extremity of the southernmost Halibut Island.

White Islands, which derive their name from cliffs of slate of highly inclined strata showing white to seaward, are wooded, and attain an elevation of 80 feet at their eastern extremity. They lie nearly 9 miles eastward of East Beaver Island Lighthouse, and are the outermost of a group of islands and rocks lying off the point separating White Island Bay from Ecum Secum Inlet. The western island is named Camp Island.

Between some of these islands are channels, and a few snug anchorages; but they are far too intricate to be serviceable to any but the small schooners trading or fishing along these shores.

Bowen Ledge, a bare, flat, slaty rock, only 8 feet high, lying ½ mile 175° from the low western point of Camp Island, has a navigable channel 400 yards wide on its northern side. The ledge within the depth of 5 fathoms, is about ¾ mile in extent.

Horseshoe Shoal, wit h3 fathoms water on it, lies about 1¼ miles 183° from the center of the larger White Island.

The western end of Halibut Islands kept open westward of Bowen Ledge leads southwestwardly of Horseshoe Shoal.

David Shoal, with 4 fathoms water, is situated ½ mile 330° from Horseshoe Shoal.

Lockwood Rock, with 3 fathoms water on it, lies with the highest part of Tuffin Island seen over the eastern point of White Islands about 2 miles 303° from the latter.

The whole of Tuffin Island, open eastward of White Islands will lead eastward, and the eastern ends of Tuffin and White Islands in range will lead westward of the rock.

Lockwood Whistle Buoy, red, marked "Lockwood," is moored ½ mile southward of the rock on the western clearing mark.

Crab Rock, with 5 fathoms water, lies ¾ mile 358° from Lockwood Rock.

Tuffin Shoal.—Tuffin Shoal, situated 1½ miles eastward of Tuffin Island, is marked on its southern side by a black spar buoy.

Ecum Secum Inlet, an indentation next eastward of White Island Bay, is the abode of a few families.. A few small schooners frequent this inlet and find within it snug anchorage; but it is unnecessary to attempt a description of the crooked channel leading thereto on account of the proximity of the excellent harbor of Marie Joseph.

Buoys.—The following spar buoys are moored in the approach to Ecum Secum Inlet.

Black, on the eastern extremity of Crazy Kate Shoal, on the eastern extremity of Mad Moll Shoal, and on the southeastern extremity of Red Ballast Shoal.

Red, on the western end of Nag Rock, Siteman Rock, and Frenchman Rock.

These buoys are maintained during the season of navigation and taken up for a short time when ice prevails in the winter.

Directions.—The anchorages under Brokenback Island and in White Island Bay are not recommended, but they may prove useful in cases of emergency. Approaching the anchorage under Brokenback Island from the eastward or westward do not pass to the northward of the line between the Bassoon Reefs and White Islands until Baptiste Island (of red clay banks, 70 feet high and partly wooded) is seen eastward of Brokenback Island. When the highest part of Baptiste Island is in range with the eastern end of Brokenback Island, bearing 304° (which range leads to the eastward of Snapper Shoal), steer on this range, and giving Brokenback Island a berth of about 200 yards, anchor in 10 fathoms sand, with Bird Islands open westward of Brokenback Island, bearing 175°, and the northern Halibut Island just open southward of Gold Island.

To enter White Island Bay steer in with Harbor Rock (composed of slate, 30 feet high, and nearly bare of trees) in range with the western side of Moser River, bearing 345°. In passing to the westward of Halibut Islands be careful that the western end of Hartlin Island is kept well open of Goose Island, in order to clear Salamander Rock, with only 1 foot on it at low water. After clearing Salamander Rock steer so as to pass 200 yards eastward of Harbor Rock and westward of Bull Rock, which uncovers at low water; then steer in 23° and anchor in about 6 fathoms mud, northward of the western end of Hartlin Island.

In clear weather Pumpkin Island may be seen distinctly when off White Islands; and by keeping it just open northward of East Beaver Island Lighthouse, bearing 261°, it will lead to the southward of all shoals (with the exception of Chapel and Hard) off White Island Bay. If Pumpkin Island can not be seen, White Islands should not be approached nearer than at least 2 miles in passing, on account of Horseshoe Shoal.

Landmark.—A church stands on ground 80 feet high, in Smith Cove, eastward of the harbor, and may be seen from the sea.

Marie Joseph Harbor, secure and well sheltered, has the advantage of entrances east and west, but the channels are narrow and should not be attempted without a pilot by any vessel with a greater draft than 9 feet. The inhabitants scattered along the shores principally rely on fishing for subsistence, but cultivate the drift hills and keep cattle.

As any attempt to convey an intelligible description of the numerous islands and off-lying dangers would prove useless the navigator is referred to the charts of the harbor and adjacent coasts.

Supplies.—Water may be obtained in Lobster Cove in small quantities, and fresh provisions and fuel can be bought at reasonable prices from the inhabitants.

Gull Ledge, lying 1½ miles southward from Barren Island, is composed of two bare ridges of slate 30 feet high and separated only by a narrow gully just wide enough to afford shelter to a boat. Close to the ledge the water is deep, but the passage to the northward, between Gull and Nightcap Ledges, the latter 10 feet high, is rendered dangerous by West Rock, covered by 2 feet only.

Smith Rock, of small extent, with 2 fathoms, lies 1,200 yards 203° from Gull Ledge. West Black Ledge, in range with the southern end of Tuffin Island, bearing 274°, leads southward of this danger.

Seal Ledge, 2 miles northeastward of Gull Ledge, is broken rocky ground with a small islet rising 4 feet above high water, near its western end; it extends 1¼ miles from the eastern point of Barren Island.

Channel.—Between this ledge and the Black Prince, Lang, and Sand shoals is the channel, nearly 1 mile wide, leading into Marie Joseph Harbor, which, on account of the dangerous shoals on its eastern side, should not be attempted by sailing vessels without a pilot, unless the wind be fair and the weather clear.

The range leading to the eastward of Seal Ledge is Gravel Point, the northern extremity of Liscomb Island, open of Liscomb Point, bearing 6°.

Thrumcap Islet, not more than 15 feet high and distinguished by a clump of trees, lies at the eastern entrance of Marie Joseph Harbor. There are some patches of shoal water, with from 1¼ to 2½ fathoms eastward of the islet, and on its western side is a dry rocky ledge, between which and Smith Point is a channel 200 yards wide, but not much used or generally known.

The more direct channel is southward of Thrumcap Islet, and this is narrowed to 200 yards, at the distance of ½ mile to the eastward of the islet, by a rock with only 1½ fathoms water on the northern end of Pan Shoal; Turner Point on Hawbolt Island in range with Smith Point bearing 269°, leads northward of this rock.

Thrumcap Islet Light, fixed white, elevated 40 feet above high water, visible 11 miles, is exhibited from a square white lantern, surmounting a square white wooden building with a red roof, the whole 36 feet in height, erected on the eastern point of Thrumcap Islet.

A hand foghorn is sounded at the lighthouse.

Thrumcap Shoal is a collection of patches of shoal water, with from 1¼ to 2½ fathoms, eastward of the islet, on the northern side of the channel.

Pan Shoal, on the southern side of the channel and ½ mile to the eastward of Thrumcap Islet, extends northward from Barren Island, and has a rock with only 1½ fathoms water on its northern end.

Turner Point, Hawbolt Island, in range 270° with Smith Point, leads northward of this rock.

A black spar buoy is moored on the extremity of Pan Shoal.

Turner Shoal.—This shoal extends from Hawbolt Island, has 1½ fathoms at its extremity, which is marked by a black spar buoy.

Middle Ground.—This shoal is a muddy flat with eel grass and with about 1 fathom over it, on the northern side of the channel; it is marked by a red spar buoy. Smith point, in range with Thrumcap, passes southward of this buoy.

Siteman Rock.—This rock, at the western entrance to the harbor, has a depth of 1 fathom on it and is marked by a red buoy.

Frenchman Rock.—This rock, at the western entrance, is awash. The spit extending southwestward from it is marked by a red buoy.

Anchorage.—Good and convenient anchorage can be obtained in a depth of 7 fathoms mud, about halfway between Lobster and Turner Points. The chart also shows an anchorage in 4½ fathoms about 800 yards northwestward of Turner Point.

Directions for Western Entrance to Marie Joseph Harbor.—In approaching from sea with the usual southwesterly wind, bring the highest part of Tuffin Island midway between Halibut and White islands, bearing 20°; proceed mid-channel between these islands, being careful to avoid the 4 and 5 fathom patches off White and Frying Pan islands, respectively, and around the shoals extending from them at a distance of 400 to 600 yards until Brokenback Island appears between the two northern Halibut Islands, bearing 263°, then steer on this range astern.

This range leads between Hubbub Rocks (dry at half tide and always breaking) and Tuffin Shoal; when Harbor Rock is just open eastward of the high grass field on Nicum Point, bearing 330°, steer with these marks in range, which will lead midway between Frenchman Rock and the shoals extending to the eastward of Sheet Rock. Continue on this course until the southern point of Round Island, in Marie Joseph Harbor, is in range 70° with Epe Point; then steer upon this range until nearly abreast of Blackbill Point, when keep in mid-channel, passing Round Island about 200 yards to the northward; haul in to the northward, and for either of the anchorages already described.

There are other passages leading into this channel, but directions for them would be useless without local knowledge; and therefore only the more direct and least dangerous will be described.

To pass between East and West Black Ledges, which are bold-to, and separated by a channel about 800 yards in width, bring the low and wooded western end of Goose Island midway between the two ledges bearing 325°, and upon that course steer in; when within the ledges steer to pass to the eastward of Hubbub Rocks, and enter the channel before described.

If passing between White Islands and Little White Island, bring the western end of the latter in range with western end of Goose Island, bearing 357° to clear the shoal off the eastern end of White Islands, and steer in on this range until abreast of White Islands; then alter course to pass between Little White Island and Hubbub Rocks on one hand, and Byrne Rock and Tuffin Shoal on the other, into the channel before described.

Directions for Eastern Entrance.—Being off Gull Ledge with a leading wind, bring Gravel Point, Liscomb Island, open of Liscomb Point, bearing 6°, the range for leading to the eastward of the Seal Ledge, and run in on this course until the high barn on Hawbolt Island shows northward of Barren Island; then steer for the church steeple on the northeastern side of Smith Cove, until Turner Point, Hawbolt Island, apparently in range with Smith Point, when keep those points in range 292°, which will take a vessel close to the northward of Pan Shoal Buoy, after passing which steer mid-channel (the channel here is only 200 yards wide) between Thrumcap and Barren

Island, and Smith Point and Turner Shoal, and from thence between Middle Ground Buoy and Hawbolt Island to the anchorage.

Liscomb Island, 2 miles long, and 150 feet high, is wooded, and lies 1 mile southwestward of Redman Head, and between it and Liscomb Point to the southwest; from its position it tends to shelter Liscomb and Little Liscomb Harbors. A narrow and shoal channel separates this island from Hemloe Island.

Liscomb Island Light, alternating flashing red and white, elevated 64 feet above high water, visible 13 miles, is exhibited from a white square wooden tower, 28 feet in height, on the western side of Liscomb Island, 150 yards east-southeastward of Cranberry Point.

A hand foghorn is sounded.

Shoals.—A shoal, composed of bowlders and having a least depth of 6 feet, 10 yards in extent within the 3-fathom curve, lies 440 yards 44° from Crook Point, the eastern end of Liscomb Island.

A shoal, composed of bowlders and having a least depth of 6 fathoms, 50 yards in extent within the 7-fathom curve, lies 1.2 miles 136° from Crook Point.

The sea breaks on this shoal in heavy weather.

Crook Shoals.—From Crook Point, the southeastern extremity of the island, Crook Shoals extend nearly 1 mile to the southeastward. Wedge Island Lighthouse apparently in range with Wine Head, bearing 33°, leads about 800 yards southeastward of the shoals.

Mackerel Shoal, with only 2 feet water, extends westward nearly 400 yards from Cranberry Point, the western extremity of Liscomb Island. It will be avoided by keeping the English Church Steeple in Little Liscomb Harbor just open of the trees on Hemloe Island, bearing 329°.

A red conical buoy is moored off the western extremity of Mackerel Shoal in 8 fathoms and must be left on the starboard hand in entering Liscomb Harbor. This buoy is replaced during the winter months by a red spar buoy.

Channel Rock, lying 2¼ miles 122° from Crook Point, has 3 fathoms on it, and breaks when there is much swell.

Smoke and Cranberry Points, apparently in range, bearing 292°, lead clear westward, and the southern points of Barren and Goose Islands in range 261°, lead 1,700 yards southward of Channel Rock.

Liscomb Harbor.—The entrance to this excellent and capacious harbor, which is landlocked and tolerably smooth at all times, is between Liscomb Point and Liscomb Island. About 1¼ miles within the entrance the harbor trends in a westerly direction for 4 miles; but at the distance of 2 miles the channel is considerably narrowed by rocky shoals, which extend from the northern shore, after which it maintains a breadth of 200 yards up to its head, where it receives the waters of Liscomb River, a rapid shallow stream abounding in trout and salmon. On the northern side of the harbor is a large cove named Spanish Ship Bay, but it is too much encumbered with rocks to render a description intelligible.

Communication.—There is a telegraph station at Liscomb.

Supplies.—Good water can be obtained from a little brook on the southern shore of the harbor, and small supplies of fresh provisions and firewood may be purchased.

Population.—The population is scattered along the shores of Liscomb, Little Liscomb, and Gegogan Harbors.

The church in Little Liscomb Harbor, which has a steeple, forms a prominent object from the sea and a useful landmark.

Storm signals are hoisted at Liscomb.

Liscomb Fairway Light and Whistle Buoy, cylindrical, painted black and white in vertical stripes, marked "Liscomb" in white, surmounted by a pyramidal steel frame, supporting a whistle and lantern, from which an occulting white light is exhibited, is moored in a depth of 28 fathoms, 5 miles 148° from Liscomb Island. Light.

Little Liscomb Harbor.—The small channel between Hemloe Island and the mainland is known as Little Liscomb Harbor. The entrance to the harbor lies northeast of Liscomb Island and has fair anchorage, but is only adapted for small vessels.

The harbor may be entered safely by bringing Redman Head apparently in range with the northeastern side of Hemloe Island, bearing 304° and passing at the distance of about 200 yards from the head.

Buoys.—The following wooden spar buoys are moored in Little Liscomb Harbor:

A black buoy northward of the ¼-fathom shoal, northward of Hemloe Island, 900 yards 75° from the northwestern point of Hemloe Island.

A black buoy northward of the ¼-fathom shoal, northward of Hemloe Island, 440 yards 54° from the northwest point of Hemloe Island.

A red buoy on the western side of the 2-fathom shoal westward of Hemloe Island, 800 yards 122° from the spire of the English Church at Little Liscomb.

A black buoy on the western side of the channel opposite the last-mentioned buoy.

Redman Head is a steep wooded bluff 100 feet high, forming the western point of the harbor. There are several dangers off its eastern side, leaving a channel only 400 yards wide between them and Redman Head.

Little Liscomb Harbor Light, fixed white elevated 35 feet above high water, visible 11 miles, is exhibited from a white square wooden tower, 22 feet high, erected on the southwestern part of Redman Head.

A hand foghorn is sounded from the lighthouse.

Dangers off the entrance.—Although the rocky patches off the entrance of Liscomb Harbor are numerous, the danger from them is considerably diminished by the fact that they all lie nearly in the same direction, viz, south-southeastward from Liscomb Point.

Hawbolt Rock, the most outlying danger, has a depth of 4½ fathoms upon it, and lies 4 miles 161° from Liscomb Point. It seldom breaks, but a vessel will pass to the southward of it by keeping Gull Ledge just in range with the southwest side of Tuffin Island.

Sand Shoal, composed of rock and sand, with a depth of 1½ fathoms, lies 3 miles 163° from Liscomb Point. Gull Ledge, apparently in range with the northern side of Little White Island (which has a wooded hummock 50 feet high), bearing 252°, leads southward of this danger and between it and Hawbolt Rock.

MacKinlay Shoal, with a depth of 4½ fathoms, is situated ½ mile 40° from Sand Shoal.

Black Prince Shoal, which uncovers at half tide, and generally breaks heavily, lies 1 mile within Sand Shoal and 2 miles 158° from Liscomb Point.

Land Shoal, covered with 1½ fathoms water, lies about 800 yards 214° from Black Prince Shoal.

East Breaker and Lump Rock lie, respectively, 1,300 yards 6° and 1,800 yards 341° from Black Prince Shoal; the former has ½ fathom and the latter 1¾ fathoms on it.

Liscomb Shoal extends eastward ½ mile from Liscomb Point, and the least water on its outer part is 2½ fathoms. The church steeple at Little Liscomb, bearing 328°, will clear this danger.

Liscomb Shoal Bell Buoy, black, marked "Liscomb Shoal," is moored in a depth of 5 fathoms, off the eastern extremity of Liscomb Shoal, 1,300 yards from the point; vessels should pass eastward of the buoy. Replaced during the winter by a spar.

Anchorage.—The anchorage is about 1,600 yards westward of Pye Point and 800 yards southward of Lang Island in 4¾ fathoms mud, but vessels can doubtless anchor nearer the wharf on the western side of Pye Point, according to draft.

The lighthouse on Liscomb Island, bearing 338°, leads eastward of all these outlying shoals.

Saddle Rock, with 5 fathoms water, lies on the eastern side of the channel leading to Liscomb Harbor, 2¾ miles 155° from Crook Point.

Gull Ledge apparently in range with the northern side of Little White Island, bearing 253°, leads southward; and the church steeple in Little Liscomb Harbor, seen just westward of Cranberry Point, leads westward of Saddle Rock.

Tides.—The high water interval is 7h. 45m.; mean range, 5.3 feet, spring range, 6.5 feet. The currents are weak and irregular, being much affected by the winds.

Directions.—Approaching the harbor from the westward, and being outside Hawbolt Rock, bring the church well open of Liscomb Point and stand in, so as to bring the former in range with the low trees of Hemloe Island, bearing 327°. These marks in range will lead clear of all danger until approaching Mackerel Shoal, when the church steeple should be kept open of the trees on Hemloe Island until abreast Mackerel Shoal; then steer 330° for the church, and after passing Smoke Point at a distance of about 400 yards, alter course to the westward so as to pass about midway between Pye Point and the southern shore, and anchor in about 4½ fathoms, mud, with the eastern ends of Lang and Pye Islands in range and Smoke and Cranberry Points in range.

From the eastward with a fair wind bring Smoke and Pye Points in range, bearing 304°, and run in upon this mark till abreast Mackerel Shoal, when proceed as before directed.

With an offshore wind, in standing to the westward, take care to tack immediately the church steeple appears open of Hemloe Island, until within Liscomb Shoal; and in standing to the eastward, tack when Cranberry and Pye Points are in range, until abreast of Cranberry Point, when the steeple must be kept just open of the trees on Hemloe Island to clear Mackerel Shoal. Within this, both shores may be approached safely to 200 yards, and anchorage obtained as before.

Gegogan Harbor.—This deep inlet is not much frequented and has but few settlers. Vessels of 12 feet draft may anchor near its head secure from all winds; but the narrow channel leading to it, on the northeast side of Rae Island, is only 100 yards wide, and should not be attempted without a pilot. Below this the anchorage is exposed to the ocean swell, and the approaches to it are much impeded by Shag and Tobacco Ledges.

Brig Point is low and wooded on the western side of the harbor entrance. The shore bank, terminating in a head of 13 feet, extends 800 yards from the point in a northerly direction.

The middle of the small bare gravel islet, united at low water to the northern end of Tobacco Island, in range with the wooded part of the northeastern side of that island, leads clear of this rock.

Tobacco Island, low and wooded, lies at the entrance of Gegogan Harbor. A vessel will pass southward of the Tobacco Ledges, extending 1 mile south-southeastward from the southern point of this island by keeping Pye Point well shut in behind the northwestern end of Liscomb Island, bearing 276°.

Shag Ledge is distinguished by a low dark rock, only 5 feet above high water, which lies 1,400 yards 91° from Redman Head, a steep wooded bluff 100 feet high, forming the western point of the harbor. There are several dangers off its western side, leaving a channel only 400 yards wide between them and Redman Head.

Directions.—A vessel intending to enter Gegogan Harbor by the middle passage, between Tobacco Island and Shag Ledge, should bring the northeastern side of Hemloe Island apparently in range with Redman Head, bearing 302°, and steer in with this mark until Shag Ledge is in range with Brig Point, bearing 330°, then steer to pass 400 yards eastward of Shag Ledge, after which a northerly course will lead through the channel only 400 yards wide between the fathom shoal northward of Brig Point and the rocks extending from the opposite shore to the anchorage.

Anchorage.—Good holding ground will be found abreast the houses on the western side of the harbor, between Brig Point and Coote Head, in a depth of 4 fathoms.

Wedge Island, about 250 yards in extent, lies 2 miles southwestward from Cape St. Mary on the western side of the entrance to St. Mary River.

The island is composed of clay and toward the mainland rises abruptly to the height of 50 feet; it is surrounded by rocky ledges and those on its northern and southern sides extend out more than ½ mile. Between it and the mainland, although the passage is obstructed by Steering Reef and other rocky ledges, a depth of 20 feet may be carried through, but on no account should this channel be attempted by a stranger.

Wedge Island Light, flashing white, elevated 81 feet above high water, visible 14 miles, is exhibited from a white square wooden tower, 44 feet in height, erected on Wedge Island.

A hand foghorn is sounded at this lighthouse.

Sand Shoal, with a depth of 5 fathoms on it, lies 1¾ miles 144° from Wedge Island and only breaks after heavy gales.

St. Mary River, one of the largest rivers in Nova Scotia, flows into the bay between Barachois Point and Cape St. Mary.

Bar.—The entrance is obstructed by a bar of sand nearly ¼ mile broad, over which a depth of about 14 feet at low water, ordinary spring tides, was dredged in 1900–1901, but which has now, it is believed, shoaled to 12 feet. The outer edge of the bar lies between Wharf Point and Black Head; its inner edge being a little below Shag Reef, which extends 250 yards southward from the western point of McDiarmid Cove.

The river.—It has been found that generally speaking there is 1½ feet more water than shown on the chart; it is therefore assumed that a depth of 13 feet may be carried from the entrance to the mill below Sherbrooke. For the first ½ mile above the bar the channel of the river is crooked and dangerous, running close to Shag Reef and the eastern bank of the river. Half a mile within the bar and nearly in a central position between the shores of the river is Horton Islet, between which and the eastern shore is the navigable channel. From the islet a long spit, which dries at low water, extends parallel with the eastern shore toward Shag Reef, leaving a channel between 250 yards in width.

Nearly in the center of the channel, a little below Horton Islet, is a rock with 1 fathom water, and within the islet about 160 yards is another rock with about 1½ fathoms. Above these rocks the channel, about 50 yards wide, and carrying a depth of 15 feet, winds its way between mud flats and gradually decreases in depth and width until at the distance of 6½ miles from the bar it divides into two branches, the western one of which ends in a swamp, but the other, the main river, makes an abrupt turn round a steep slate rock at right angles to its course and is navigable nearly ½ mile farther to the northward.

NOTE.—A report in 1907 states that all rocks in the St. Mary River which were dangerous to shipping have been removed.

Buoy.—A black spar buoy is moored on the outer edge of the shoal extending off Black Head.

Landmarks.—Below Sherbrooke, on the eastern bank of the river, there is a church and a chapel, one of which, 75 feet high, forms a prominent object, and can be seen on approaching from the sea.

Caution.—After the continuance of southerly winds there is a considerable swell in the bay and the bar of this river is one mass of breakers, making the entrance during any time of the tide very dangerous if not impracticable; but in the summer months, during the prevalence of southwest winds the water is smooth, the bay being much sheltered by Wedge Island Shoals. The shores of the bay are rocky and should not be approached nearer than 400 yards.

Clearing marks.—Black Head and Birch Point in range, bearing 321°, leads clear to the eastward of the shoal off Barachois Point.

Sherbrooke.—On the eastern bank of the river at the head of navigation is the village of Sherbrooke; its principal trade is in firewood, deals, and shipbuilding, and it employs a few schooners in the Labrador fisheries.

Communication.—There is a telegraph station at Sherbrooke.

Pilots.—The services of a pilot can be obtained from McDiarmid Cove, on the eastern side of the entrance to St. Mary River, by a vessel carrying the usual pilot signal.

Budget Light, fixed red, elevated 23 feet above high water, visible 6 miles, is exhibited from a white square wooden tower, 23 feet in height, constructed on a cribwork foundation, erected on the southeastern extremity of Horse Shoal, in the entrance to the river.

Directions.—In approaching St. Mary River from the eastward, the first object generally recognized is Wedge Island Lighthouse. With the wind and weather favorable, steer for this lighthouse, clear of the outlying dangers, so as to open out the river until Budget Lighthouse is in range with Birch Point 313°, which will lead to the entrance of the river nearly to Shag Reef. To cross the bar safely, the crooked channel and the cross set of the tides render a pilot or local knowledge absolutely necessary.

Anchorage.—Vessels frequenting this river moor head and stern, or are secured to the wharves, as there is not sufficient width in the channel, with any scope of chain, to swing clear of the mud flats. During the summer months vessels occasionally anchor in a depth of 5 fathoms sand, in the middle of the bay, between Barachois Point and Cape St. Mary; but later in the season such anchorage is not recommended.

Cape St. Mary, 137 feet high, is the headland immediately to the eastward of St. Mary River, and on its eastern side is Wine Harbor, affording neither shelter nor anchorage.

Indian Harbor, with its entrance between Walter Island on the west and Holland Head on the east, is entirely open to the southeastward and only affords some shelter from southwesterly winds to fishing and small coasting vessels. The head of the bay receives the water of a large fresh-water lake, from which it is separated only by a narrow beach of sand. The hills forming the shores of the lake and bay afford good soil and are carefully cultivated.

Several shoals extend from the headlands forming the eastern side of this bay, the most dangerous and extensive of which is Nixonmate Shoal.

Wine Head is a high clay bank on the western side of the entrance to Indian Harbor.

Walter Island is low and wooded, and at low water a beach of sand and stones nearly unites it to the mainland near Wine Head. A reef of rocks extends 400 yards from its eastern side, affording some shelter to an insecure anchorage in the cove northward of the island, sometimes used by coasting vessels.

Rude Shoal, composed of rock, extends rather more than ½ mile in an easterly direction from Wine Head, on the western side of the entrance to Indian Bay.

Fleming Cliff, 317°, on the western side of the bay, seen well open of Rude Point, leads eastward of Rude Shoal.

Walter Shoal, covered with 3 fathoms, lies ¾ mile 171° from Walter Island.

Wedge Island Lighthouse in range 241° with Crook Point, the eastern extremity of Liscomb Island, leads southeastward of Walter Shoal.

Hollins Head, the southwest point of Hollins Harbor, bearing from the lighthouse on Wedge Island 56°, 6¾ miles, is a small and remarkable peninsula united to the mainland by a long beach of stones and shingles, having on its eastern side a cliff of reddish clay and bowlders 50 feet high. At the time of the survey in 1856 it was fast wasting by the action of the sea.

Hollins Harbor, the next inlet to the eastward of Indian Harbor, is open to the southeastward and affords shelter at its head to boats and small craft. At its entrance, two-thirds the distance across toward Bickerton Island, lies Hollins Shoal, with only 1 fathom water on it.

Nixonmate Shoal, with 1½ fathoms over it, is situated on the extremity of the bank extending from Hollins Head and 1.2 miles from it.

Bell buoy.—A red bell buoy, marked "Nixonmate" in white, is moored, in a depth of 20 fathoms, 1.2 miles 196° from the 1½-fathom patch on the shoal. This buoy marks the entrance to Indian Harbor.

Webb Rock, 800 yards from Hollins Head, has 1 fathom over it. There is a patch of 2½ fathoms between the above two rocks.

Clearing marks.—Castor Rock and Cape Mocodome in range bearing 51°, leads ½ mile to the southward of these dangers, and 800 yards outside a 5-fathom patch lying 1.7 miles southwestward from Hollins Head.

Channel.—There is a clear passage, ½ mile wide, between the reef off Hollins Head and Castor Shoals.

Fleck Shoal, the outermost danger off this part of the coast, with 3¼ fathoms water, is situated 2¾ miles southwestward of Pollux Rock.

Clearing mark.—Green Island seen open southward of Pollux Rock, bearing 57°, leads southward of Fleck Shoal.

Castor Rock, small, formed of dark slate, and 4 feet above high water, is nearly 1½ miles south-southwestward from the eastern point of Bickerton Island.

Castor Shoals are rocky patches with depths of 3 to 5 fathoms upon them, comprised within a radius of 1 mile from Castor Rock.

Port Bickerton.—A safe and convenient little harbor for small vessels, has a clear entrance, having 6 fathoms water, between Bickerton Island and Barachois Head, but it is less than 400 yards wide.

Bickerton Island is about 50 feet high. A shoal extends 400 yards southeastward from it on the western side of the harbor entrance. A narrow boat channel separates it from the mainland.

Barachois Head, on the eastern side of the entrance, may be known by its white cliff, from which a shoal extends 400 yards to the southeastward.

Port Bickerton Light, fixed white, elevated 43 feet above high water, visible 7 miles, is exhibited from a white square wooden tower 23 feet high, on the western extremity of Barachois Head, 30 yards within the coast line.

A hand foghorn is sounded.

Round Island is 10 feet high, small, with red clay banks, 1 mile inside the harbor.

Shoal.—There is a shoal with ¾ to 1 fathom on it in the middle of the harbor, 600 yards eastward of Round Island.

Directions.—To enter Port Bickerton, being ½ mile or more from the entrance, open Round Island only so far as to apparently be in range with the northeastern side of Bickerton Island, bearing 307°; steer in with these marks in range until abreast the southeastern point of the island. When, having passed in mid-channel through the entrance, avoid the shoal in the middle of the harbor by keeping about 200 yards from the eastern shore until abreast Round Island, where a vessel may anchor within the shoal in about 2 fathoms, mud.

If preferable after entering, steer to the westward along the northeastern shore of Bickerton Island at a distance of 200 to 400 yards from it, so as to pass between the island and the shoal into the western part of the harbor. The anchorage here, in 2 fathoms, over mud bottom, is sheltered by the reefs, which leave only a shallow boat channel between Bickerton Island and the mainland to the westward.

Pollux Rock, formed of slate, of small extent and 4 feet high, lies 2¼ miles 181° from Cape Mocodome, and from it a reef extends 800 yards to the northwestward. The eastern extremities of Cape Mocodome and Country Harbor Head in range lead over the end of this reef; therefore to pass clear to the westward of it Country Harbor Head must not be opened out farther than to be only just seen in range with the bank or cliff of Cape Mocodome and over the shingle beaches which form its southeastern extremity.

Bingly and Taylor Shoals.—Bingly Shoal, with a depth of 2½ fathoms water over it, lies ½ mile 68° from Pollux Rock. Taylor Shoal, 1,400 yards farther to the southward, is covered by 3 fathoms and bears 116°, nearly 1 mile from Pollux Rock; the two points on the eastern side of Goose Island, in range bearing 31°, lead eastward of this shoal, but those points are low and can seldom be distinguished. These two shoals are all the more dangerous inasmuch as they break only during a heavy sea.

Middle Ledge, or Southeaster (so named in reference to its position from Cape Mocodome, from which it bears 131°, distant 3¾ miles), is a rock about 200 yards long, which covers at half tide; it is the apex of a rocky shoal about 800 yards long northwest and southeast, around which the soundings are too deep and irregular to afford much warning by the lead. When the sea breaks on this shoal, as it invariably does except with a high tide accompanied by unusually smooth water, there is no difficulty in passing on either side of the ledge, the nearest danger to the westward being Taylor Shoal, which bears from it 263°, nearly 2 miles; it is only necessary when passing on that side to give the rock or breaks a berth of ½ mile.

Buoy.—A black can buoy, with "S. E. Ledge" in white letters, and surmounted by a cage, is moored in 15 fathoms about ½ mile east-southeastward from Middle Ledge.

To the eastward the passage between Middle Ledge and Tomcod Shoals is 2 miles wide, and the marks that clear Middle Ledge on that side, at the distance of 800 yards, are the western points of Goose Island in range, bearing 359°, and these marks lead also over Jarvis Bank, a fishing ground lying 1 mile farther out to the southward and on which the depth is 14 fathoms. The ranges for passing to the southward or outside of Middle Ledge are Castor and Pollux Rocks in range, bearing 282°, or Pollux Rock and Hollins Head in range 286°; these marks also lead close inside or northward of Taylor Shoal.

Note.—It should, however, be remembered that Castor and Pollux Rocks are only 4 feet high, and there may be difficulty in seeing them, except from a considerable height at the required distance.

Rose Shoal, the most formidable of the dangers off Fisherman Harbor, is a rocky ledge about 1,400 yards long, on which the least water is 1 fathom. Its outer or southern end bears 124°, nearly 1½ miles from the extremity of Cape Mocodome, and from Pollux Rock 41°, about 1¾ miles. The range for leading to the southward of Rose Shoal is Flick Point on the northern side of Hollins Harbor, just open of Bickerton Island, bearing 283° and for clearing to the northward, Barachois Head and Cape Rock in range, bearing 271°.

Bull Rock, lying 700 yards southeastward from Cape Mocodome, is small, and dries at low water; it is situated on the shoal extending from the cape, on which there are other rocks with 1 fathom water, the outermost being 900 yards eastward of the cape. These rocky shoals are exceedingly dangerous at high water and with a smooth sea, when they are not marked by breakers.

Bull Rock Bell Buoy, black, marked "Bull Rock" in white, is moored 500 yards 135° from Bull Rock. Replaced by a spar buoy during the winter.

Cape Rock, 4 feet high, lies nearly 200 yards off the low shingle beach, in which Cape Mocodome terminates.

Black Ledge, more than 1 mile long, lies directly off the mouth of Fisherman Harbor. The central part of it is 2 feet above high water, and in several other parts it dries, or nearly so, at low water. From its southern extremity, which is steep-to and covered by only 2 feet water, Cape Mocodome, in range with Hollins Head, bears 252° and is distant rather more than 1 mile. Hollins Head, kept open of Cape Mocodome, leads southward, and the summit of Mount Misery (in Country Harbor), in range with Country Harbor Head, bearing 319°, leads eastward of Black Ledge.

Fisherman Harbor, about 1½ miles wide at the entrance between Cape Mocodome and Country Harbor Head, is quite open to the southeastward, so that the only part that can be termed a harbor is a cove on its southern side, formed by a long beach of shingle, and in which vessels may lie securely, in 1½ to 2½ fathoms at low water, over a bottom of mud. Outside the cove the holding ground is good in 4 to 7 fathoms, and, as the sea is in some degree broken by the dangers off the mouth of the bay, large vessels with good ground tackle might safely anchor there during the summer months.

Fisherman Harbor Light, fixed red, elevated 25 feet above high water, visible 6 miles, is exhibited from a square wooden tower, 27 feet in height, painted white, on the northwestern extremity of the shingle beach. Exhibited annually from April 1 to December 15.

Rock.—There is a rock with 1½ fathoms over it ½ mile eastward of the lighthouse, and nearly 400 yards from the southern shore at the entrance to the harbor.

Directions.—To enter Fisherman Harbor from the southward, and being within Pollux Rock, observe that the range which just clears the rocks off Cape Mocodome is Holly Point (on the western side of the entrance of Isaac Harbor), just open of Country Harbor Head, bearing 355°; therefore, to pass between Bull Rock and Rose Shoal, steer in with those marks in range, keeping Holly Point only a degree or two open until past Rose Shoal, when the point may be opened more in order to give the rocks off the cape a wider berth.

As soon as Dorkin Island, at the head of the harbor, opens out to the northeastward of the shingle beach, at the cove on the southern shore, bearing 283°, the vessel may steer to the westward into the bay, where the only danger is a rocky shoal, having 1½ fathoms water, extending ¼ mile from the high clay cliff next eastward of the cove just mentioned.

Proceeding for the harbor from the eastward, between Rose Shoal and Black Ledge, the range is Dorkin Island and the shingle beach of the cove, bearing 300°. The channel between the shoal and the ledge is about 1,400 yards wide, so that there would be no difficulty in working in, with the assistance of the chart, and attending to the range marks for clearing the opposite points of Black Ledge and Rose Shoal; but there would be less sea, with a westerly wind, between the ledge and Country Harbor Head, where there is also a clear channel ½ mile wide.

Country Harbor is unequaled by any other on the coast eastward of Halifax. It may be easily recognized by the three islands—Harbor, Goose, and Country—on the eastern side of the channel leading to it and Isaac Harbor, as well as by Country Harbor Head. The entrance, where the channel is 600 yards wide, with a depth of 11 fathoms, is abreast Harbor Point 1 mile to the northwestward of Ragged Point.

From thence the harbor preserving a breadth from 700 to 1,000 yards, with a depth varying 5 to 10 fathoms, is easily navigable as far as Stewart Cove on the eastern shore, off which is an excellent land-locked anchorage in 4½ to 7 fathoms, mud, 4 miles from the entrance. Throughout this distance the only danger to be avoided is a rock, with ½ fathom water, about 100 yards offshore near the southern point of Mount Misery Peninsula.

From Stewart Cove the channel becomes narrow, but continues navigable for large vessels 2½ miles above it and for small vessels to the entrance of the river at the head of the harbor, which is 7¼ miles from its entrance at Harbor Point. Boats can ascend the river 2 miles, or to ½ mile above the bridge, where the tide ends.

The shores of this harbor are steep-to on either side, the summits of the ridges being generally only a short distanct from the shore and increasing in elevation from 200 feet at the entrance to 470 feet near its head. On the western shore about 1,400 yards within the entrance is Green Point, composed of shingle, inclosing a large pond, and ¾ mile farther in on the same side is Mount Misery.

Buoy.—A red spar buoy is moored about 400 yards from the shore, midway between Harbor and Ragged Points.

The population, scattered along the shore, is principally occupied in lumbering and the fisheries.

Communication.—There is a telegraph station near the head of Country Harbor.

Tides.—The high water interval in Country Harbor is 7h. 25m.; spring range 6½ feet, and mean range 5⅓ feet. The tidal currents are weak, seldom exceeding ½ knot an hour.

Country Harbor Head, which forms the northeastern entrance point of Fisherman Harbor and the termination of the western shore of Country Harbor, is a bold and precipitous headland, 160 feet high, formed of clay slate in nearly vertical strata.

Mount Misery is a remarkable round hill, 143 feet in height, standing on a projecting point on the western shore of Country Harbor about 1.7 miles from the entrance, which forms the principal range mark for clearing the dangers lying off the entrance to the harbor.

Shoal Place, the most off-lying of the easternmost Country Harbor Ledges lies 2.3 miles 151° from Country Island Lighthouse. It is small and rocky, with 5 fathoms of water, and breaks only when a heavy sea is running.

Tomcod Rock covers at high water and lies 1.3 miles from Shoal Place, and the same distance southward of Country Island. When breaking, as it usually does, this danger serves to warn vessels of their approach to the Tomcod Shoals, which are small rocky patches scattered around the rock in various directions.

Tomcod Shoals.—The northernmost of these patches, named Gull Nest, covered with 3 fathoms water, bears from Tomcod Rock 352°, 800 yards, and from Country Island 186°, ¾ mile, with a clear passage between. But the westernmost patches at depths of 2¼, 3¼, and 4 fathoms are most in the way of vessels bound to or from Country Harbor. The ranges that lead close to the westward of them are Harbor Island, open westward of the low dry reef off Flying Point (the southern extremity of Goose Island) bearing 335°, or the summit of Mount Misery, in range with Harbor Point, bearing 313°.

Country Island, about 30 feet high, the smallest and outermost of the off-lying islands, lies nearly 4 miles west-southwestward from New Harbor Head.

Country Island Light, fixed and group flashing white, elevated 51 feet above high water and visible 12 miles, is exhibited from a white square wooden tower, with two red horizontal bands, 28 feet in height, on the south point of the island.

Goose Island, about 80 feet high, is situated about 1 mile northward of Country Island; it is 2 miles in length north and south.

Harbor Island, 40 feet high, and 800 yards westward of Goose Island, closely approaches the mainland near Isaac Harbor, being separated from it, at low water, by a deep-water channel only 400 yards across.

These islands are formed of drift bowlder clay, resting on highly inclined clay-slate rock, and are wooded with small spruce trees.

Harbor Island Light, occulting white, elevated 37 feet above high water, visible 11 miles, is exhibited from a square wooden lantern rising from the middle of the hip roof of a square wooden building, the sides of the building and lantern painted white and the roofs red, erected on the end of the shingle point at the northwestern end of the island.

Caution.—The numerous off-lying dangers in this locality forbid the coast being approached, nearer than the depth of 30 fathoms, during dark nights or fogs, and the constant use of the lead should be deemed indispensable, for by it alone can the position of the vessel be ascertained..

White Rock, with 1½ fathoms over it, lies 1¼ miles 66° from Country Island Lighthouse, and ¼ mile farther off, on the same bearing, there is a rock with a depth of 4½ fathoms. There are other patches nearer the island, the southernmost of which, covered with 2¼ fathoms water, lies 1,600 yards 75° from the lighthouse.

Frying Pan, a small shingle reef 4 feet above high water, lies 400 yards off the northern end of Country Island.

Pan Rock, with only ½ fathom water, lies about 1,400 yards 302° from Country Island Lighthouse.

Ragged Ledge extends in an easterly direction, about 1¼ miles from Sheep Pen Point, the eastern end of Goose Island, and from its outer extremity, which is seldom entirely covered, the whole of the reef is partially dry at low tides. There is no passage for vessels between this ledge and Country Island, or between Goose and Country Islands, the whole space being studded with rocky patches having from 1½ to 3 fathoms water on them, which break heavily in bad weather.

Dutch Shoal, with 1¼ fathoms water and of small extent, lies within Ragged Ledge; its eastern edge bears from Sheep Pen Point 53°, nearly 1 mile. It is separated from the shallow water extending from the shore of that island by a very narrow channel, and its northern edge is just cleared when Burke and Beach Points (on Harbor and Goose Islands, respectively) are in range, bearing 271°, remembering that the point of the northern beach of Harbor Island must at the same time be well in sight to the northward of them both.

Burke Shoal, with 1¼ fathoms water, extends ¼ mile from the northeastern point of Harbor Island. From this shoal the high-water tangent of the northern point of Harbor Island is just open of Burke Point.

Red Head (at the entrance of Isaac Harbor) and Drum Head in range, lead northward of this danger.

Split Rock, small, and awash at low-water springs, lies near the southern end of a long rocky shoal, which, including two detached patches of 3 and 5 fathoms, extend upward of 1 mile to the northwestward of the rock.

A red nun buoy is moored 200 yards 247° from Split Rock.

From Split Rock, which is dangerous at high water and with a smooth sea, Darby Point, on the mainland near Island Harbor, appears just open northward of Beach Point (the northern end of Goose Island), bearing 288°; Country Island Lighthouse bears 239°, distant 2½ miles; and the eastern side of New Harbor Head bears 34°, distant 2¼ miles.

Brandy Ledge, the easternmost of the dangers off Country Island, is a rocky shoal 1,300 yards long and 700 yards broad, lying parallel to the coast. Near the center of the ledge is a spot which only covers at high water, and from it the southern extremity of New Harbor Head bears 340°, 1¾ miles, the channel between being clear with depths of 7 to 15 fathoms.

Directions.—With a fair wind for Country Harbor, having passed Middle Ledge, either by giving its breakers a sufficient berth or by the aid of the given range marks, bring the summit of Mount Misery in range with Country Harbor Head, bearing 319°, and steer in on this range until about midway between Rose Shoal and Flying Point, the southern extremity of Goose Island, or until the latter is abeam. Then alter course to 338° and when the summit of Mount Misery is in range with Harbor Point steer 313°, or so as to keep the last-named marks in range, until near the mouth of the harbor, which enter in mid-channel. Anchor anywhere within it, as there are no detached dangers in the way, except the rock already mentioned, lying 100 yards off the southeastern point of Mount Misery Peninsula. If intending to proceed to Stewart Cove, keep well over toward the western shore, to avoid the mussel beds that lie off the islet and the points of small coves on the eastern shore.

With a foul wind, the range marks which have been given for clearing the dangers on either side of the channel will show when to tack. In the board toward Harbor Island stand no nearer than ½ mile, to avoid the shoal water off its southwestern shore, and in standing in to the northwest of the island tack while Flying Point is well open southwestward of it, to avoid the shoals between it and Isaac Harbor.

Note.—These directions are written for sailing vessels. Steamers can adopt them to their own requirements with the aid of the chart.

Isaac Harbor is the eastern and smaller of two narrow arms of the sea northwestward of Harbor Island, being separated from the western (Country Harbor) by Ragged Point. The harbor runs in a northerly direction for a distance of nearly 3 miles, nowhere exceeding 800 yards in breadth; at its head is a rapid stream which drives a a sawmill. The shores on either side rise gradually to the summits of hills of drift clay and bowlders, from 200 to 300 feet in height, and are cultivated to some extent by an industrious community, whose principal occupations appear to be coasting trade and the fisheries.

Wharves.—There are a number of wharves, with depths varying from 15½ feet, the depth at the head of the Government Wharf, and 10, 12, 13, and 15 feet at other wharves. Some of these wharves have sheds where freight is stored. The harbor is well sheltered and, excepting for some distance near the head, is open the year round.

Communication.—There is a telegraph station at the head of Isaac Harbor.

Supplies.—Fresh provisions in moderate quantity, and water, may be readily obtained in Isaac Harbor.

Red Head is a small peninsula with red clay cliffs, on the eastern side of the entrance, and united to the mainland by shingle beaches, inclosing a shallow pond. A shoal tongue, with a depth of 2 fathoms rock on its tip, extends ½ mile south-southwestward from the head.

Ragged Point, 75 feet high, is the western point of the entrance to the harbor.

Isaac Harbor Light, group occulting white, elevated 80 feet above high water, visible 14 miles, is shown from a white square wooden tower, with red lantern, on the western side of the entrance to the harbor 900 yards eastward of Ragged Point, and the same distance from Holly Point.

A hand foghorn is sounded.

Webb Reef extends from the point northward of Red Head, westward across the entrance to the distance of 450 yards.

A red spar buoy marks the extremity of Webb Reef.

Ragged Rocks, which cover at high water, extend 600 yards south-southwestward from the lighthouse.

The channel between Ragged Rocks and Webb Reef is 300 yards wide, with a depth of 6½ fathoms.

These dangers, and some shallow water within the harbor off its western shore, render a pilot necessary to strangers entering this beautiful little harbor, in which vessels may anchor securely in a depth of 3½ to 4 fathoms, mud.

Webb Cove, in which the fishing and coasting vessels usually anchor, in a depth of 2 fathoms, mud, is on the eastern side of Isaac Harbor, and just within the entrance.

Isaac Harbor Light and Whistle Buoy, cylindrical, painted in black and white vertical stripes and marked "Isaac Harbor" in white, surmounted by a pyramidal steel frame, supporting a whistle and lantern, from which an occulting white light is exhibited, is moored in 25 fathoms water, outside the ledges in the approach to Isaac Harbor from the southeastward. From it Tomcod Rock is in range 1° with Country Island Lighthouse, distant 3¾ miles.

Island Harbor lies between Harbor Island and the mainland, in a bay, between two long shingle points, on the northern side of Harbor Island.

Drum Head is a small islet close to the mainland and connected with it at low water, directly opposite Harbor Island, 800 yards from it.

A red spar buoy marks the extremity of the shoal water extending in a southwest direction from Drum Head, and a black spar buoy in 6 fathoms, the extremity of the shoal extending northward from the northwestern end of Harbor Island.

Darby Point is next eastward of the above head.

Anchorage.—Within the line uniting the shingle points of Harbor Island, there is only depth of water sufficient for small vessels, but the anchorage farther out in 7 fathoms, mud bottom, although open to the east-southeastward, is considered safe during the summer months. It is, however, not adapted for large vessels, the deep water being confined to a narrow and crooked channel. It is advisable to moor in this narrow channel with one anchor well into the bay to the southward.

A red spar buoy marks the extremity of shoal water, extending to the southwestward from the point about midway between Drum and Red Heads.

Pilots.—During the fishing season several families reside on Harbor Island, as well as on the mainland opposite, from whence pilots may be obtained; but they are not accustomed to conduct vessels of a greater draft than 10 or 12 feet.

Tides.—The high water interval in Island Harbor is 7h. 25m.; spring range 6½ feet; mean range 5¼ feet. During the flood the current runs from the eastward and its velocity is usually less than 1 knot an hour, but it is much influenced by the winds.

Directions.—In approaching Island Harbor from the westward observe that a ridge of rocky ground, with irregular soundings, extends northwestward from Harbor Island for a distance of 800 yards. To avoid the shallow part of this ridge, which has a patch of 2½ fathoms upon it, steer to pass midway between this patch and the northwestern point of Harbor Island until Drum Head and Darby Point are in range, bearing 92°; then turn sharply to the eastward and bring Burke Point in range with the remarkable hill on Goose Island, bearing 123°, which leads to the anchorage.

From the northwest.—Being off Red Head, bring Drum Head and Beach Point in range and steer toward them 105° or as may be necessary to keep them in range until Burke Point is in range with the remarkable hill on Goose Island, bearing 123°, when proceed into the harbor with the latter marks in range and anchor as before directed.

From the eastward.—Coasting vessels usually take the inner route, especially late in the autumn, when northerly and northwest winds prevail, passing between Brandy Ledge and New Harbor Head on either side of the whistle buoy and through The Sound, as the passage between Goose Island and the mainland is termed. Having passed the whistle buoy (off Eastern Head), steer to bring the range marks Drum Head and Darby Point in range, 272°, for clearing the shoals off Coddle Harbor, Coddle Island, and Seal Cove, but it will be better to keep Drum Head just open; when abreast Graham Shoal, steer for Burke Point until Harbor Island Light bears 272°, when steer for it on that bearing to the anchorage and anchor in 7 fathoms, mud, in the anchorage given above.

Burke Point in range with Beach Point bearing 272° will clear the dangers on the southern side of the channel until abreast Dutch Shoal, after which Burke Point must be opened out well clear of Beach Point to avoid the shoal extending from the coast of Goose Island. Beach Point should be passed by bearings of Harbor Island Light.

From the southward, enter the channel between Harbor and Goose Islands, steering midway between the islands, but taking care to avoid the shoal extending from Saladin Point and the Middle Ground on one hand and the ledge off Goose Island, which is always visible on the other, until Red and Drum Heads are in range, then steer for the anchorage, keeping clear of Burke Shoal by bearings of Harbor Island Light.

Seal Cove, a small indentation in the mainland immediately opposite Goose Island, dries at low water, with the exception of a narrow channel only available for boats.

Coddle Harbor, situated within the island of the same name, possesses secure anchorage for small vessels in a depth of 2 to 2½ fathoms. The principal entrance is from the eastward, but as the dangers are too numerous for any written directions to avail, the place should on no account be attempted by a stranger.

Buoys.—Three red and three black spar buoys are moored in Coddle Harbor.

Coddle Island is about 1 mile in length, northwest and southeast, and 60 feet in height.

New Harbor Head is a low, rounded head of shingle, rising to 100 feet.

New Harbor Whistle Buoy, red iron, marked "New Har. Hd." in white, is moored in a depth of 15 fathoms, 1¾ miles 110° from the southeastern extremity of New Harbor Head. Replaced during the winter by a spar buoy.

New Harbor Cove, eastward of New Harbor Head, is merely a shallow bay open to the southeast and affording no safe anchorage. From Shoal Point on its western shore a rocky spit extends ¾ mile to the southeastward. At the head of the cove is the entrance of New Harbor (St. Catherine) River, only 1 foot deep at low water and dangerous to boats when there is any sea running. For the first 5 miles the river flows through a narrow inlet, which boats can ascend to its head. The stream then becomes rapid and unnavigable for 4 miles farther, to the large lake from whence it flows.

Communication.—There is a telegraph station at New Harbor River.

Little Harbor, a small shallow indentation in the coast, about 2 miles eastward of New Harbor Cove, is only adapted to admit boats at high water. About ½ mile from its entrance, in a southeast direction, is Net Rock, with about 3 fathoms water, and to the southward, 2¼ miles, is a patch, with a depth of 6 fathoms, known as Tuffin Bank, on which the sea is said to break occasionally after very heavy gales.

Tor Bay, nearly 9 miles long, east and west, and 4 miles deep, has at its eastern end a very narrow isthmus or haul-over for boats, which separates it from Whitehaven. On its northern shore Charlo and Cole Harbors and Port Felix (Molasses Harbor) afford secure anchorages for small vessels in 2 to 3 fathoms.

Aspect.—On the shores of Port Felix is a settlement of Acadians, and on an elevation 110 feet above the sea, on the western side of the entrance, stands their chapel, a large wooden building without a steeple. There are settlements also at Cole and Charlo Harbors, as well as on the banks of Larry River at the western end of the bay. At the settlements the drift bowlder clay is cultivated sufficiently to afford pasture for cattle. A short distance inshore the barren granite hills rise to the height of 360 feet.

Entrance—Depth.—The principal entrance into Tor Bay, where there is a clear channel ¾ mile wide, with a depth of 8 to 12 fathoms, lies between Berry Head, on the western side, and the Sugar Islands.

Directions.—With a fair wind into Tor Bay, steer in with the western extremities of the islet, next eastward of Topstone Ledge, apparently in range with Mars Head, and bearing 27°, or with the eastern point at the entrance of Cole Harbor open westward of Topstone Ledge—the apparent breadth of the latter—bearing 6°, whichever course the wind may render preferable. When Berry Head Lighthouse bears 259°, alter course to pass about ½ mile outside Flat Point, and get the southern extremities of Topstone and Green Ledges in range, 90°; and keep those range marks astern until Webber Shoal is passed; then steer for the anchorage, in 6 fathoms, mud, 1,400 or 1,600 yards northeastward of Webber Cove.

NOTE.—The above directions, as will be seen, are written for sailing vessels; they can, however, be easily modified to suit steamers.

If proceeding to either Cole or Charlo Harbor, the range lights at those places will form sufficient guide, after the spit extending from Berry Head has been passed.

The anchorage within this entrance, off Webber Cove, at the western end of the bay, in a depth of 6 fathoms, sand and mud, is secure and easy of access, the only danger in the way being Webber Shoal.

Hog Island is situated on the western side of the entrance of Port Felix.

Port Felix Light, fixed white, elevated 42 feet above high water, visible 8 miles, is exhibited from a white square wooden tower, 37 feet high, on the southeastern end of the island.

A hand foghorn is sounded from the light station.

Berry Head, the western point of Tor Bay, is a low rocky point at the eastern extremity of a peninsula, nowhere exceeding 80 feet in height, and which is united to the mainland by a beach and range of sandhills. Shallow water extends off this peninsula 800 yards to the southward; and off Berry Head there is a reef, as well as detached rocks, with depths under 3 fathoms on them, the outermost lying 800 yards eastward of the head; these must all be left to the westward when proceeding into the bay.

Tor Bay Light, fixed, showing red seaward and white to the northward, elevated 51 feet above high water, visible 10 miles, is exhibited from a tower 36 feet high, painted white, with vertical red stripes, on the eastern point of Berry Head.

A hand foghorn is sounded. (See Light List.)

Tor Bay Whistle Buoy, conical, painted in black and white vertical stripes, is moored in 21 fathoms, 1 mile 141° from Tor Bay Lighthouse.

Sugar Islands are a small group not exceeding 30 feet in height, composed of clay slate, which stretch across the eastern part of the bay to the distance of 3½ miles westward from the eastern shore.

Topstone Ledge is at the western extremity of the Sugar Islands; it would appear to be always above water from the chart.

Webber Shoal, of 2 fathoms, lies 600 to 1,200 yards from the northern side of the peninsula, of which Berry Head is the eastern extremity.

The southern extremities of Topstone Ledge and Green Ledge (Sugar Islands) in range, bearing 89°, lead northward of Webber Shoal; small vessels only should attempt to pass southward of this shoal. To the northward of Webber Shoal the passage is not less than ½ mile wide between it and either Charlo Shoal or Larry Reef, which lie to the northeastward and northwestward of it, respectively.

Charlo Harbor is situated on the western shore of Tor Bay, and has a depth of from 1 to 2 fathoms in it.

Charlo Range Lights.—Two fixed red lights, elevated, respectively 28 and 51 feet, and visible 3 miles over a small arc on either side of the range line, are exhibited, from white square wooden towers 23 feet in height. The front light is near the northeastern extremity of the western point of the harbor; the rear light is 247 yards 287° from the front light.

Directions.—Vessels proceeding to Charlo Harbor (after passing clear of the reefs off Berry Head) should keep Cole Harbor white lights in range, until the Charlo range lights are in line, 287° when they should be steered for on this bearing, to clear the reefs off Forster Island.

A red spar buoy is moored on the northern side of the entrance to Charlo Harbor, off Dorion Point.

A black spar buoy is moored on the southern side opposite the above-mentioned buoy.

Port Felix affords secure anchorage in 2 to 3 fathoms for small vessels.

Directions.—The bell buoy, which should be passed to the westward, situated to the westward of Flying Point Shoals, marks the approach to this harbor.

Port Felix Light is a guide to vessels bound into Port Felix, and should be steered for on the bearing 0° to clear the outlying shoals; after passing the light, a more easterly course leads into the harbor.

Cole Harbor affords security for small vessels.

Cole Harbor Range Lights.—Two fixed white lights, elevated 40 and 107 feet, respectively, above high water and visible 8 and 10 miles, are exhibited from white square wooden towers, 33 feet in height. The front tower is near the water's edge on the northern side of the harbor entrance and the rear tower 217 yards 11° from it.

These lights in range (11°) shave the edge of the 3-fathom spit extending eastward from Berry Head, after passing which they lead westward of Topstone Ledge and Seal Rocks into Cole Harbor.

Cole Harbor Light, fixed red, is shown from the dormer window of a house near the shore on the southeastern side of Cole Harbor.

Directions.—Vessels entering Cole Harbor should keep on the alignment of the Cole Harbor range lights (11°) until the above red light opens clear of the intervening bluff point on the southern side of the harbor when they should run for this harbor light on a 74° course to an anchorage, and thus clear the reef on the southern side of the entrance to the harbor.

Larry River.—The channel at the mouth of Larry River is marked on the western side by two black spar buoys and on the eastern side by one red spar buoy.

The channel is marked for a farther distance inside the buoys by four stakes on the eastern side and three stakes on the western side.

Communications.—There is a telegraph station at Larry River.

Larry Reef lies eastward of Larry Point and is covered at half tide.

Shag Rock, 2 feet above ordinary high water, lies 2¼ miles 235° from Berry Head and ½ mile from the nearest shore. Shallow water extends 800 yards southeastward from the rock, and between it and the shore there are several rocks which dry at half tide.

Gull Rock, small and detached, with 2 fathoms water over it, is the greatest danger on the western side of the entrance. It lies nearly 1 mile 212° from the lighthouse on Berry Head.

Clearing mark.—Shag Rock and New Harbor Head in range 256° leads nearly 400 yards southward of Gull Rock and 600 yards southward of Torbay Ledges.

Torbay Ledges, lying on the eastern side of the entrance, are exceedingly dangerous. French Rock, the farthest out, with only 1½ fathoms over it, lies with Topstone Ledge off the western extremity of the Sugar Islands, bearing 352°, distant 1½ miles; Tor Bay Lighthouse, 274°, 1¼ miles, and Bull Rock, covered with ½ fathom (which usually breaks), 71°, 1,400 yards. The other ledges lie between these and the Sugar Islands, with deep water between them, but so scattered as to leave no safe passage.

Hog Island, apparently in range with Leblanc Point, bearing 35°, leads eastward of Bull Rock, and the eastern point at the entrance of Cole Harbor open westward of Topstone Ledge, bearing 4°, leads westward of French Rock and the ledges next northward of it. This mark, however, does not clear Brig Rock, the northwestern ledge, with 1½ fathoms water, from which Topstone Ledge bears 14°, distant 600 yards.

The soundings are so irregular around these ledges and the depth so great (15 fathoms) close to them that the lead affords little warning of approach.

Flying Point Shoals, nearly 1 mile long northwest and southeast, lie in the eastern part of the bay, about ½ mile westward of Flying Point. The least depth, 1 fathom, is at the northwestern end of the shoals, nearly 1 mile 292° from Flying Point.

Flying Point Shoals Bell Buoy, red, marked "Flying Pt." in white letters, is moored southwestward of Flying Point Shoals, 1¾ miles 175° from Hog Island Lighthouse, and should be left on the starboard hand by vessels bound for Port Felix.

Whitehaven is a secure harbor with sufficient space and depth of water for a fleet of large vessels, but, like most of the indentations on this coast, the entrances, three in number, are narrow and indirect, and the sunken rocks numerous, so that no large vessel could safely attempt them at night or in the dense fogs that so frequently prevail.

The shores of the harbor have a barren and desolate appearance, the woods having been extensively burnt off the granite hills especially on the eastern side. On the eastern shore there are hills of the drift bowlder clay, affording pasture for the cattle of the fishermen, who reside principally in Doliver and Marshall Coves, but whose houses are also seen at intervals all the way to the head of the Northwest Arm, 7 miles from the entrance of the haven.

Three Top Island may be easily recognized by the three remarkable hills, 50 or 60 feet high, from which its name is derived.

Three Top Island Light, fixed white, elevated 48 feet above high water, visible 11 miles, is exhibited from a square lighthouse, 32 feet high, painted white, on the southeastern point of Three Top Island.

This light guides vessels into Whitehaven Harbor and is obscured when bearing eastward of 34° 30′, also to point out the dangers on the northern side of the western passage at the harbor entrance. It is visible from all other points of approach, except where intercepted by the high land of Whitehead Island.

Dangers in Inner Channel.—A short distance within the entrance, and northeastward of the middle of Three Top Island, there is a rock with 3½ fathoms water, lying toward the eastern shore, which reduces the breadth of the channel between it and the island to 300 yards.

The eastern extremity of Gammon Islets and the southwestern end of Whitehead Island apparently in range bearing 138°, lead to the southwestward of this rock; and also clear the shoals farther in off Doilver Island and Deming Point, on the western side of the harbor.

Wreck.—An obstruction, supposed to be the wreck of a schooner, lies about 600 yards 356° from the lighthouse on Three Top Island.

The wreck, as shown on the chart, lies on the same bearing for clearing the above inner dangers.

Kelp Shoal, with only ½ fathom water, lies directly in the way of vessels passing westward of Fisherman Island.

Whitehead Island, 120 feet high, about ½ mile long, north and south and ¼ mile broad, derives its name from the whitish granite rock of which it is composed and forms a salient feature off the point of land eastward of Whitehaven, its inner or northern end being about 700 yards from the main shore. The interior of the island is wooded with dwarf spruce trees.

Whitehead Island Light, group flashing white, elevated 55 feet above high water, visible 11 miles, is exhibited from a pyramidal shaped wooden building 35 feet high, painted white, with two vertical red stripes, on the southwestern point of Whitehead Island.

A diaphone fog signal is installed in a square white wooden building with a gable roof.

Whitehead Light and Whistle Buoy, cylindrical, painted in black and white vertical stripes, and marked "Whitehead," surmounted by a pyramidal steel frame supporting whistle and a lantern, from which an occulting white light is exhibited, is moored in a depth of about 30 fathoms, 2½ miles 169° from Whitehead Island Lighthouse. It is a fairway buoy for the guidance of vessels proceeding along the coast, or seeking to make Whitehaven.

Southwest Bull, with ¾ fathom water, lies 1,250 yards 205° from the lighthouse. Rocky ground, with 4 fathoms water, extends 800 yards in a westerly direction from it, and there are rocky patches with 5 fathoms water between it and Whitehead Island.

Southwest Bull Bell Buoy, black, marked "S. W. Bull" in white and surmounted by a bell, is moored in a depth of 10 fathoms, 200 yards, southeastward of the rock. This buoy is replaced by a spar buoy during the winter.

East Bull, lying 1,200 yards 111° from Whitehead Island Light, on the western side of the eastern entrance to Whitehaven, is a small detached rock, covered by 1 fathom water.

Sculpin Rock, which dries at low water, lies halfway between East Bull and Whitehead Island; and midway between East Bull and Millstone Island, there is a rocky shoal carrying 3¼ fathoms water. The entrance to the eastern passage into Whitehaven Harbor is between this shoal and Millstone Island.

Dover Head, open to the southward of Millstone Island, bearing 55°, leads to the southward of both the East and Southwest Bull Rocks, but very close to the former.

Black Ledge dries at low water. Its western extremity is situated 1 mile 256° from Whitehead Island Lighthouse.

Doliver and Fisherman Islands, apparently in range bearing 351°, lead southwestward of Black Ledge, while Bald Rock and Flying Point, in range bearing 313°, will lead southwestward of it, and also of Southwest Bull Rock.

Shag and Rocky Ledges lie between Black Ledge and Whitehead Island Lighthouse, and are above water.

Gammon Islets, 30 feet in height, small, and composed of bare granite, will be seen northeastward of Shag Ledge.

Bald Rock, lying 1.7 miles 273° from Whitehead Light, is above water, and has a shoal ledge, with 1 fathom on its extremity extending 600 yards eastward from the rock.

Inner and Outer Gull Ledges, lying inside Bald Rock, extend 1,400 yards to the southward from Deming Island, which, being united to the mainland at low water, forms the western point of entrance to Whitehaven. These ledges and rocks are all above water, but there are reefs between and around them.

Net Rock (joined by a reef to the southeastern end of Three Top Island) and Spry Point, in range bearing 43°, lead clear to the southeastward of the dangers extending from Bald Rock.

There is little or no warning by the lead in approaching any of the above dangers from seaward, the depth exceeding 20 fathoms, being but a little more than ¼ mile from them.

Directions.—The entrance to Western Passage into Whitehaven is ½ mile across from Black Ledge to the ledge extending from Bald Rock. Proceeding into Whitehaven Harbor in a steamer, or with a fair wind through Western Passage, attention must be paid to the marks already given for clearing the rock off the Outer Gull Ledge on the one side and the Bull Rocks and Black Ledge on the other. It is seldom that the Black Ledge or the breakers on it can not be seen, and it may then be passed at any distance btween 200 and 800 yards; but to run in nearly midway between it and the rock off Bald Rock, bring Net Rock to bear 28°, and round this rock to the eastward and northward of it at the distance of 200 yards, with the lighthouse a little open to the eastward of Gammon Islets, bearing 132°, until the northern end of Three Top Island is nearly abeam; then alter court to the northward, taking care to keep Whitehead Island open eastward of the Gammon Islets, in order to clear the shoals off Doliver Island and Deming Point on the western shore; and the lighthouse open westward of Spry Point, to clear Yankee Island Reef on the eastern shore.

Southern Passage into Whitehaven, only 200 yards wide, is between Whitehead Island on the east and Southwest Bull, Rocky Ledge, and Gammon Islets on the west. Steer to pass eastward of the Southwest Bull for the western side of Whitehead Island, which should be passed at a distance not exceeding 200 yards; open out Millstone Island until it is in range with Dogfish Point, bearing 105°, keep those marks astern and pass southward of Turtle Rock and Reef off Spry Point. When the lighthouse is seen just open eastward of Gammon Islets, proceed as directed above.

Eastern Passage into Whitehaven is rendered so intricate and dangerous by Middle Rock, with only 1 fathom water, and other shoals, that it should never be attempted in a large vessel, unless in case of necessity. Between Middle Rock and Paddy Ledge the passage is not quite 200 yards wide. For entering, steer in with the summit of the northernmost hill on Three Top Island in range with Dogfish Point, bearing 290°, passing 200 yards to the southward of Millstone Island. To pass between Middle Rock and Paddy Ledge open out the northernmost hill a little to the northward of Dogfish Point, and alter course as required to pass midway between shoals extending from Whitehead and Mink Islands.

Round Dogfish Point to the westward at the distance of 200 yards, until it and the southern extremity of Millstone Island are in range bearing 104°, then steer to pass southward of reef extending from Turtle Rock; and when Whitehead Island Lighthouse, bearing 132°, is just open eastward of Gammon Islets, keep those objects astern until the northern end of Three Top Island is nearly abeam, thence proceed according to previous directions.

Inner Passage.—The marks for proceeding through the channel (only 100 yards wide) between Kelp Shoal and Fisherman Island are the western extremities of Pilot Point and of Yankee Islet in range, bearing 153°. There is also a passage westward of Kelp Shoal, between it and the shoal, which extends 300 yards offshore to the southward of Marshall Cove; but the marks for running through it, namely, the western sides of Monroe Rock, Three Top Island, and Shag Ledge in range, bearing 158°, might not easily be distinguished by a stranger. The best passage for a large vessel proceeding farther in to the more completely sheltered parts of the harbor is eastward of Fisherman Island, where there is a clear channel 100 yards wide with a depth of 8 fathoms.

The channels northwestward of Three Top Island, on either side of Doliver Island, are so narrow and full of rocks as to be only available for small vessels and boats.

Anchorage.—Good anchorage may be obtained in 7 to 10 fathoms mud immediately within Yankee Island Reef, and also off the fish stages and houses on the western shore, although some swell sets in with the strong southerly winds. Small vessels anchor in Yankee Cove, into which 3½ fathoms can be carried through a very narrow channel.

Having passed through one of the channels, on either side of Fisherman Island, anchorage may be chosen either in Marshall Cove or farther up the harbor, where the only detached danger in the way, until the vessel arrives at the entrance of the Arms, is a rocky shoal with 3¼ fathoms water lying ¼ mile westward of White Islands; Fisherman Island eastern point and Pilot Point in range, bearing 174°, leads westward of this shoal.

Lifeboat.—A lifeboat is stationed on Deming Point, western side of entrance to Whitehaven.

Tides.—High water interval in Marshall Cove, Whitehaven Harbor, is 7h. 45m.; spring range 6.6 feet and mean range 5.4 feet. The velocity of the tidal currents in the entrance seldom exceeds ½ knot an hour unless it be the ebb current when accelerated by heavy rains or the melting of the snow in spring.

The harbor.—The shores of the harbor have a barren and desolate appearance, the woods having been extensively burned off the granite hills, especially on the eastern side. On the western shore there are hills of the drift bowlder clay, affording pasture for the cattle of the fishermen, who reside principally in Doliver and Marshall Coves, but whose houses are also seen at intervals all the way to the head of the Northwest Arm, 7 miles from the entrance of the haven.

Raspberry, Crane, and Wine coves are small intricate indentations between Whitehaven and Port Howe, abounding in sunken rocks and difficult of access. They are adapted for small craft and boats, but without good local knowledge of the neighborhood and its numerous dangers the approaches to these places are perilous in the extreme.

Port Howe, to the westward of Dover Island, is a small bay, dangerous to approach on account of numerous shoals. The entrance lies between Howe Point to the eastward and Black Rock, 4 feet high, off Fluid Point on the western shore. The distance across is about 700 yards, but the navigable channel is narrowed by shoal ground to little more than 300 yards.

Within the entrance the shores are mostly steep-to, and there is sufficient depth of water for the larger vessels, but in the parts not exposed to the southerly swell there is barely room for a vessel to swing at single anchor.

Anchorage.—The best anchorage is in the mouth of the Western Arm, care being taken to avoid a sunken rock, with only 1¼ fathoms water, lying rather more than 200 yards 141° from the point which separates the western and northern arms. There is also secure anchorage within Port Island and in the mouth of Dover Passage, but in both positions the space is very limited, and it would be necessary to moor.

Port Howe.—As on some occasions Port Howe might prove useful as a harbor of refuge, it would be advisable for seamen frequenting this coast to make themselves familiar with the marks for clearing the following dangers:

Howe Point is the western extremity of Dover Island; rocks extend 400 yards from it. These, together with those extending from Snorting Rocks, must be left to the eastward when proceeding into Port Howe.

Avery Shoal, with 3¼ fathoms water, lies nearly 1 mile southwestward of Whale Island and ¾ mile from the southeastern extremity of Millstone Island.

Vache and Whale Shoals, having on them 1½ and 3¼ fathoms water, lie 700 yards and 1¼ miles, respectively, north-northeastward of Avery Shoal. Whale Rocks, which dry at low water and are farther inshore, and Whale Shoal, lie on the western side of the channel leading to Port Howe.

Dover Head seen open southward of Snorting Rocks, bearing 45°, leads southward of Avery Shoal, which should be given a wide berth by vessels running along the coast, and also to the southward of Vache and Whale Shoals.

Dover Shoals.—Dover Shoals, with 4 fathoms water over them, lie on the eastern side of the entrance of the channel, into Port Howe, the outermost being situated 1,100 yards 152° from the outer extremity of the Snorting Rocks.

Snorting Rocks, which project out ¼ mile and never cover, are nearly joined at low water to the southwestern extremity of Dover Island. Sunken rocks, with various depths on them, extend westward ¼ mile from Snorting Rocks.

Directions.—The marks for entering Port Howe are Black Rock in range with the remarkable Sugar Loaf Hill, 180 feet high, about 1 mile inland from the entrance of Kyak Brook at the head of the harbor. Being outside the shoals, bring the above marks in range, bearing 331°, and steer toward them until the southern extremities of Whale and Millstone Islands are nearly in range, bearing 224°; then alter course to pass 200 yards eastward of Black Rock.

If proceeding to the anchorage at the mouth of the western arm, endeavor to preserve a mid-channel course between Port Island and the western shore, anchoring in about 8 fathoms, mud, with the western end of Snorting Rocks just seen open of the point westward of Port Island and keeping a little over toward the southern shore in order to avoid the sunken rock off the point which separates the Arms. If the anchorage within Port Island be preferred, pass around the northwestern end of the island at the distance of 200 yards, to avoid the reef extending therefrom, and anchor within it as convenient; bottom mud.

Dover Island, 95 feet high, upward of 1 mile in extent east and west, and about ½ mile broad at its western part, forms a salient point of the coast between Dover Bay and Port Howe.

Dover Passage.—Dover Island is separated from the mainland by a narrow, but navigable, channel, with 2 fathoms water, known as Dover Passage; it is frequented by fishermen and small coasting vessels. In the narrowest part the passage is only 60 yards across, and is not adapted for either large vessels or strangers.

Dover Bay is 2½ miles wide at the entrance from White Point westward to Dover Head, and extends 4 miles to the north-northwest; although so extensive, it affords but little shelter, being filled toward its head with islets and rocks above and under water, among which only small vessels could pass.

Louse Harbor, on its western shore, 1 mile within Dover Head, has within it depth and space sufficient for a large vessel; but its entrance, to the northward of Louse Island, with 3½ fathoms water, is only about 60 yards wide.

Little Dover Run is a very narrow channel between White Island, forming the eastern side of Dover Bay, and the mainland; its narrowest part being only about 30 yards wide, with 3 fathoms water. It leads in among the islets at the head of the bay, and is frequented in the season by fishing vessels.

Several spar buoys have been placed to mark various shoals situated in the southeastern approach to Little Dover Run, and near the head of Dover Bay.

The channels marked by these buoys can only be made use of by fishermen and others with local knowledge.

Dangers.—The dangers at the mouth of Dover Bay are: Hicks Shoal, with 2¾ fathoms, 1,100 yards northwestward from White Point; Lumsden Shoal, with 2¼ fathoms, 1,300 yards northwestward from White Point; Horne Shoal, with 3 fathoms, lying 1,600 yards eastward from Louse Head, and nearly midway between the head and White Island; Bay Shoal, with 5 fathoms, lying nearly half-way between Dover Head and White Point, and breaking only after heavy gales; Blackman Shoal, with 4¼ fathoms over it, 1,600 yards eastward of Dover Head; and a rock with ½ fathom water on it, 600 yards southward of Dover Head.

Submarine cables.—Eight telegraph cables are landed in Dover Bay, viz: Two Commercial ocean lines and two Western Union ocean lines, while there are three short lines running to New York and one to Rockport.

Dover Bay is the terminus of the above-mentioned ocean cables; here are situated the large operating stations that transmit the European messages to the American Continent, and vice versa, through the shorter cables.

White Point Ledges extend nearly 1,200 yards to the southward of White Point; and White Rock, with 5 fathoms water, which breaks after heavy gales, lies ½ mile farther out.

White Point Ledges Whistle Buoy, black, marked "White Pt." in white, is moored in a depth of 26 fathoms ½ mile 156° from White Rock and 1½ miles 149° from White Point.

Cranberry Island Lighthouse, bearing 18°, kept open to the eastward of the trees on Cape Canso, clears the White Point Ledges and White Rock.

Gannet Shoal, with 1½ fathoms least water, situated 1 mile 55° from White Point and on the western side of the entrance to Andrew Passage, consists of several detached patches. There are other rocks to the northward of it off Madeline Point and at the entrance of Little Dover Run, to avoid which and insure the safe guidance of a vessel the chart is necessary. The soundings are deep and irregular near these dangers, so that the lead will afford practically no warning at night or in thick weather. In the daytime Cranberry Island Lighthouse, kept open to the eastward of the trees on Cape Canso, bearing 18°, will lead to the eastward of Gannet Shoal.

A black can buoy is moored in 19 fathoms, about ¼ mile southeastward of the 3-fathom outer patch of Gannet Shoal.

The buoy is taken up for the winter in December and replaced on the disappearance of ice in the spring.

Andrew Island, about 1¾ miles long and 1¼ miles broad, is separated from the mainland by a channel about 700 yards wide. The island is low, its greatest elevation, 50 feet, being near the northeastern part; it is also boggy and barren, with groves of stunted spruce over its surface. On all sides, excepting the western, the island is surrounded by a fringe of dangerous shoals.

Andrew Passage, between Andrew Island and the mainland, which leads to Glasgow and Canso Harbors, is too intricate for a written description to avail. It is frequented occasionally by fishing and small coasting vessels, but even with the aid of a chart local knowledge is indispensable for the safe guidance of a small vessel.

Gannet Ledges.—Southward of Cape Canso the shore of Andrew Island is fringed with shoal water. On this shoal are several rocky patches and foul ground, also Gull Egg and Old Man Islets; from the latter, which is a rock 2 feet high, Cape Canso bears 8°, distant nearly 1 mile. Gannet Ledges form the southeastern extremity of this shoal water and extend nearly 1 mile eastward from Gannet Point, the southern extremity of Andrew Island, there being a depth of ¾ fathom water with Gannet Point bearing 278°, 1,700 yards. Half a mile southwestward of this depth of ¾ fathom there is an isolated rocky patch of ½ fathom with depths of 13 fathoms between it and the ledges. From the ½-fathom patch Gannet Point bears 311°, 1,400 yards.

Clearing mark.—The southern extremity of Dover Island in range with White Point, bearing 243°, leads ½ mile southward of these ledges and the dangerous Boom Rock.

CHAPTER VI.

CHEDABUCTO BAY, WITH MADAME ISLAND AND LENNOX PASSAGE—GUT OF CANSO—GEORGE BAY—NORTHWEST COAST OF CAPE BRETON ISLAND.

Chedabucto Bay, through which vessels entering or leaving the Gulf of St. Lawrence by the Gut of Canso must pass, is 17.3 miles wide at its entrance from Cranberry Island to Michaux Point, but the entrance is generally considered to lie between Grime Rock, the eastern of the Canso Ledges, and Green Island, which are 7½ miles apart. The depth of the bay from Grime Rock to Guysborough is 25½ miles.

Cape Canso to Guysborough.—The south shore of Chedabucto Bay, from Cape Canso to Guysborough, is composed of primary rocks, partially covered with drift sand, clay, and bowlders. This drift appears occasionally in high, red cliffs on the shore; when cleared of stones it furnishes a tolerably productive soil, but the climate is not favorable to agriculture, and the large fishing population obtain little beyond a few vegetables and food for their cattle. Drift ice in May, and the prevailing easterly winds in June, bringing fog from a cold sea, check vegetation until past midsummer, and there is seldom settled warm weather before July. But fishing, not farming, is and has been here the principal industry. Codfish, herring, and mackerel swarm along these shores, and the latter especially are taken in incredible numbers, both in the spring and fall of the year, by the numerous fishing schooners.

Cape Canso (lat. 45° 19′ N., long. 60° 56′ W.) is a rocky islet, 15 feet high, joined to the eastern point of Andrew Island at low water by a sandy neck about 200 yards in breadth. Cape Rock, small, and 8 feet high, lies 250 yards southeastward of the cape.

Andrew Island, about 1¾ miles long north and south, and 1¼ miles broad, is separated from the mainland of Nova Scotia by a channel about 200 yards wide. The island is low, its greatest height of 50 feet being near its northern end, and it is boggy and barren, with groves of stunted spruce over its surface. The island is surrounded, except on its western side, by a fringe of shoals.

Andrew Passage, between the island and the mainland, although frequented occasionally by fishing and small craft, is intricate, and requires local knowledge.

Glasgow Head, a remarkable red clay cliff, 50 feet high, lies 1¼ miles northwestward of Cape Canso; and 1¾ miles farther in the same direction, along an unbroken shore, are the town and harbor of Canso.

Cranberry Island, 1¼ miles from Cape Canso, marks the northeastern side of the entrance of the channel into Canso Harbor; it is low, rocky, ¼ mile long, and divided into several parts at high water.

Cranberry Island Light, group occulting, 89 feet above high water, visible 15 miles, is exhibited from an octagonal tower painted in red and white horizontal bands, rising about the red roof of an attached white dwelling on the northern part of Cranberry Island.

A fog signal is made from a white square building with red roof, on the summit of the southern part of Cranberry Island.

Frying Pan, a low islet of shingles, lies ¼ mile nothwestward of Cranberry Island Lighthouse.

Crow Islet, a low rock, coverel with dark spruce bushes, and 20 feet high, is ¾ mile farther in the same direction.

Crow Reef lies about 400 yards southeastward of the islet, and Budget Rock, with 7 feet water over it, lies 600 yards further southeastward. There is a rock with 16 feet water over it at 300 yards southeastward of Budget Rock.

The eastern channel to Canso Harbor between the shoal off Frying Pan Islet and Budget Rock and Crow Reef is about 270 yards wide, with a least depth of about 8 fathoms.

Petit-pas, a round, grassy islet, 200 yards across, with a red clay cliff 50 feet high on its southeastern side, lies 295° 1.4 miles from the lighthouse.

Oliver Island is wooded, and separated from the eastern end of George Island by a narrow boat channel; Lock Point, its eastern end, bears 30° distant ¼ mile from Petit-pas.

Grassy Island, 800 yards westward of Petit-pas, is a hill of drift sand, clay, and bowlders, ½ mile long, and 66 feet high, and is now united to the southwestern side of George Island by a bar of shingle which is never covered. The island is covered with grass, and its southeastern end is a clay cliff. The remains of an extensive redoubt give the name of Fort Point to the high western end of the steep grassy bank of this island, which, when used as a leading mark, must be carefully distinguished from the edge of the shingle beach extending from it 200 yards to the northwest. There is a narrow channel for boats between the beach at the northwestern end of Grassy Island and Piscatiqui Island, and the coast of Piscatiqui Island forms the eastern side of the channel thence to Canso Harbor.

Canso Harbor is of considerable historical as well as nautical interest. It was visited by French fishermen and traders as early as the sixteenth century, and during the next 200 years it was the frequent scene of French and Indian warfare with British colonists, falling, with the rest of Acadia, alternately under the power of

France and England, until the contest for dominion in America finally terminated in 1759.

The harbor is formed by Piscatiqui and Grassy islands on the east, and by the mainland and Durell Island on the west. Cutler or Hart Island, with the shallow water between it and Durell Island, shelters the harbor from the northward, while Grave Islet and the bar uniting it to Lanigan Beach protect it from the southeastward. Grave Islet is very small, with steep clay banks fast wasting away by the action of the sea, but a breakwater 290 feet long has been built across the top of the island in a north and south direction. The entrance to the harbor is between Grave and Cutler islands, within which and off the town there is secure anchorage, with water for vessels of any draft.

The position of this harbor, at the southern entrance of Chedabucto Bay, through which numbers of vessels pass, gives it importance. Many vessels pass through the harbor in order to avoid rounding the rocks and ledges outside it, and it is frequented by others engaged in the fisheries, or using it as an occasional anchorage.

Depths.—The ship channel has a least depth of 21 to 24 feet between Grave Islet and Piscatiqui, and the northern entrance a least depth of 20 feet between Cutler Island and Piscatiqui.

Canso town is on the mainland, the older part standing on hills of red sand, clay, and large bowlders. The church, on the summit of a ridge 100 feet high, is conspicuous, and seen over the island from a distance at sea. The newer part of the town, together with two chapels are farther westward, toward the shore of the Tickle, a narrow boat channel separating Durell Island from the mainland. The whole forms a long straggling village, with a population of about 1,700. Flag Hill, 105 feet high, and used as a leading mark, is near the northern end of Durell Island, which is 1½ miles long, west and east, and 1,400 yards wide.

Ship channel—Western side.—Patch Rock, the outermost shoal on the western side, on which 30 feet water was found, but on which the sea is said to break occasionally, bears 131° 1¾ miles from Cape Canso.

Boom Rock, with 12 feet least water, bears 156° 1½ miles from Cape Canso.

Cape Breaker Rock, with 16 feet water over it, bears 106° 1 mile from Cape Canso; this rock only breaks when there is a heavy sea.

A bell buoy, painted in black and white vertical stripes, with "C. Breaker" in white letters on it, is moored in 14 fathoms at about 700 yards eastward from Cape Breaker Rock. This buoy is a fairway buoy for the southern entrance of Ship Channel.

The eastern side of Crow Island in line with the western side of Cranberry Island, bearing 329°, leads about 100 yards eastward of Cape Breaker Rock.

Roaring Bull Rock, about 800 yards westward of Cape Breaker Rock, has 2 feet least water over it and almost always shows.

A black can buoy is moored in 5 fathoms on the southeastern edge of the shoal ground surrounding Roaring Bull Rock.

Keeper Rock, with 24 feet of water, lies 1,100 yards 86° from Cape Canso.

Kirby Rock, with 15 feet water, lies 600 yards 41° from Cape Canso.

The Roman Catholic Church steeple at Canso open northeastward of Glasgow Head, bearing 299°, leads close northeastward of Cape Breaker, Keeper, and Kirby rocks.

Black Rocks, ½ mile 340° from Cape Canso, are two trap rocks about 5 feet high; being always visible, and as shoal water extends only 200 yards eastward of them, they mark the western side of the channel. The passage into Glasgow Harbor is between Kirby and Black rocks.

Bootes Bank, the southern end of which lies 900 yards eastward of Glasgow Head, extends nearly 800 yards northwest and southeast, with a width of 200 to 600 yards, and has a least depth of 6 feet.

Man-of-war Rock is situated about ½ mile northeastward of Glasgow Head and near the eastern end of a narrow bank, which extends ¼ mile east and west, with depths of 9 to 18 feet over it. The rock covers at half tide, but it is usually marked by breakers.

Black Rocks, Bootes Bank, and Man-of-war Rock rise from a shoal and rocky bank which stretches across the entrance of Glasgow Harbor. There is no safe channel for ships between them, but there is a navigable channel between them and Glasgow Head, though narrow and difficult.

A black can buoy is moored on the northeastern side of Man-of-war Rock.

The eastern ends of Black Rocks and of Cape Rock in line, bearing 153°, leads eastward of Bootes Bank and close eastward of Man-of-war Rock; therefore, keep Cape Rock open eastward of Black Rocks until Flag Hill is in line with the steep bank (not the beach) of Fort Point, bearing 294°, which last mark leads just clear northeastward of Man-of-war Rock.

Mackerel Rock lies nearly ½ mile westward of Man-of-war Rock, and has 10 feet of water over it. This rock seldom shows. There is a clear channel on either side of Mackerel Rock.

Flag Hill and the steep bank of Fort Point, as above mentioned, lead 100 yards northeastward of Mackerel Rock. Canso Harbor

Leading Lighthouses or their lights in line 266° lead between Mackerel Rock and Grassy Reef.

South Shoal, on which there is a least depth of 4 feet water, extends northeastward 600 yards off the shore at about 1,400 yards northwestward of Glasgow Head, or halfway across toward the eastern end of Grassy Island. There is a clear channel between it and Grassy Reef 350 yards in breadth.

Shoal water extends 100 yards off Grave Islet, leaving a channel between it and Piscatiqui Island 200 yards wide, with 3½ to 4 fathoms in it at low water.

Eastern side.—Stanley Shoals are four small rocky patches, the western of which is situated with Cape Canso bearing 266°, 1.3 miles. From the western patch the two southern patches bear 79°, distant 300 and 800 yards, respectively, and the northern patch 38°, 500 yards. There is a depth of 4 fathoms on the northern and western patches, which are sometimes marked by breakers, and of 5 fathoms on the other two patches.

The western ends of Derabie and Cranberry islands in line, bearing 322°, lead between these shoals and Cape Breaker Rock.

Nickerson Rock, with 4 fathoms least water, lies with Cranberry Island Lighthouse bearing 291°, 1¼ miles.

David Rock, with 13 feet water, is situated with Cranberry Island Lighthouse bearing 296° ¾ mile.

Washball Rock, a patch, dry at low water, lies 400 yards southwestward of David Rock and 1,400 yards 130° from Cranberry Island Lighthouse; it is almost always visible. David and Washball rocks lie so near the edge of the Cranberry Island Bank as to leave no safe passage between them.

Pink Rock, with 4 feet of water on it, lies ½ mile southward of Cranberry Island Lighthouse; a rocky shoal, with 18 feet water over it, extends 300 yards westward from the rock.

Flag Hill and the southwestern end of the beach of Fort Point in line, bearing 296°, leads just clear southwestward of this shoal; but if the beach can not be made out, keep Flag Hill about half a point open southwestward of Fort Point until Cranberry Island Lighthouse bears eastward of 4°.

Cow and Calf Rocks.—Shallow water of less than 3 fathoms, including the Cow and Calf, two rocks awash, extends 400 yards off the western side of Cranberry Island; there are also several rocky patches farther off, with 28 feet of water over them, which must be avoided by vessels of large draft when the sea is heavy; from the outer of these the lighthouse bears 94°, nearly ½ mile.

Frying Pan Reef stretches 800 yards westward from the low Frying Pan Islet.

Pas Reef extends eastward ½ mile from Petit-pas. Frying Pan and Pas Reefs are separated by a narrow channel. From Pas Reef the edge of the shoal continues westward, skirting Petit-pas at a distance of 300 yards, and then crosses the bay between it and Grassy Island, where it joins the shoal water off the latter.

Grassy Reef projects southward ¼ mile from the southeastern end of Grassy Island. The breadth of the deep water between it and Mackerel Rock is 250 yards, and as the channel turns there it is difficult for large vessels.

Shallow water extends 200 yards off the southern side of Grassy Island. The beach of Fort Point is quite bold, after which the channel, although much narrowed by Grave Islet, is direct and clear to Canso Harbor.

Buoy.—A red spar buoy is moored on the southwestern edge of the shoal water extending about 150 yards off Piscatiqui Island.

Range lights.—A light is shown 46 feet above high water from a square white tower 32 feet high, situated 680 yards 111° from the storm-signal station at Canso.

Another light is shown 108 feet above high water from a similar tower 44 feet high, situated 420 yards 266° from the preceding lighthouse.

These lights in line, 266°, lead between Frying Pan Shoal and Budget Rock to the entrance of the harbor.

The rear light in line with Cutler Island Light, 161°, leads between Net and Bald Rocks in the northern entrance to the harbor.

Northern entrance to Canso Harbor is difficult principally from the narrowness of the channel between Cutler and Piscatiqui Islands, where the deep water is less than 80 yards wide. The least depth in the channel fairway is 20 feet.

The northern entrance must not be attempted in a large sailing vessel without a fair and steady breeze, for, although the rocks are for the most part visible, there is no safe anchorage should the wind fail, the bottom being rock.

Fairway bell buoy.—A black and white vertically striped bell buoy is moored off the northern entrance in 13 fathoms, with Cutler Island Lighthouse bearing about 163°, distant ¾ mile.

Net Rocks, which dry at a quarter ebb, lie 400 yards off the eastern side of Durell Island and about 1,100 yards 326° from Cutler Island.

A red spar buoy is moored on the northern side of the shoal water surrounding Net Rocks and a black spar buoy on the southern side.

Whitman Rock, on which there are 2 feet of water, lies about 400 yards off the eastern side of Durell Island and 700 yards northwestward of Cutler Island.

Whitman Rock is marked by a red spar buoy on its northern side and a black spar buoy on its southern side.

The Roman Catholic Church steeple at Canso in line with the western end of Cutler Island, bearing 166° true, leads clear eastward of Net and Whitman Rocks.

Shoal water extends 200 yards northward of Cutler Island.

Bald Rock, of bare granite, 140 yards long and 30 feet high, lies 450 yards 350° from the northwestern end of Piscatiqui Island and directly opposite Whitman Rock, the channel between them being 400 yards wide.

An 18-foot patch lies nearly 600 yards northward from Bald Rock.

Bald Reef, dry at low water, lies 200 yards northward of Bald Rock, and shoal water 100 yards farther off in the same direction.

A black spar buoy is moored on the northwestern edge of the shoal water extending from Bald Reef.

Patch.—A small 27-foot patch lies in the fairway with the western end of Bald Rock bearing 122°, distant 300 yards.

Reef.—The reef extending 150 yards northward of the northwestern point of Piscatiqui Island, is partly dry at low water.

Glasgow Head in line with the western extremity of Piscatiqui Island, and bearing 138°, leads westward of this reef.

Cutler Island Light, fixed red, is shown, 42 feet above high water, from a square white tower, 28 feet high, with a dwelling attached, on the northeastern part of the middle of Cutler or Hart Island.

A fog signal answers vessels' signals.

False Passage Ledge Light, fixed green, is shown from a pole, situated on False Passage Ledge, a rock in the channel westward of Cutler Island, and 440 yards 263° from the lighthouse on that island, during November, December, and January. This light is intended principally for the benefit of the local fishermen.

Starling Rock, 230 yards southeastward from Cutler Island, and 120 yards off the western coast of Piscatiqui Island, has 4 feet over it at low water, and narrows the channel between this rock and the shoal water, which extends 250 yards southward of Cutler Island, to a width of 80 yards.

A red spar buoy is moored close westward of Starling Rock, and a black spar buoy is moored at the southeastern end of the shoal water extending southward of Cutler Island.

Beacons.—A beacon, 30 feet high, with a white triangular head, stands on Grave Islet Breakwater. There is a similar beacon on shore, at Lanigan, ¼ mile 164° from the preceding beacon.

These beacons in line lead in the fairway of the channel, between Starling Rock and the shoal water extending southward of Cutler Island.

Directions—Ship channel.—To enter Canso Harbor from the southward: Approach from a distance of not less than 3 miles, with the western ends of Cranberry and Derabie Islands in line, bearing 322°. The fairway bell buoy, eastward of Cape Breaker Rock, is passed close-to. Do not open the whole of Crow Islet westward of Cranberry Island to clear Cape Breaker Rock until Canso Roman Catholic Church steeple is open northeastward of Glasgow Head, bearing 299°. Then steer about 307° so as to make a direct course toward the southwestern side of Petit-pas; this course leads between Black Rocks, which are always above water, and the shoals off Cranberry Island.

Northward of Black Rocks, Cape Rock, open eastward of them, clears Bootes Bank and Man-of-war Rock, and when Flag Hill is in line with the steep bank of Fort Point, bearing 294°, keep this mark on, passing northeastward of Man of War Rock Buoy and Mackerel Rock. When Canso Leading Lighthouses are in line, 266°, keep them so until the eastern end of Petit-pas and Lock Point are in line, bearing 30°. Then alter course for Canso church until the southern side of Petit-pas and the northern side of Crow Islet are in line, when steer with Walsh house (on Durell Island, on the northeastern side of the entrance of The Tickle), just open southwestward of Grave Islet, which leads midway between Grassy Reef and South Shoal and clear of the shoal water off Grassy Island. When the western end of the beach of Fort Point bears 20° steer 308° for the wharf and stores on the western side of Cutler Island until Cranberry Island Lighthouse and the southern end of the beach of Fort Point are in line. Then steer 285° with the last leading mark in line astern, which leads clear of the shoal off Grave Islet and leaves the red buoy off Piscatiqui Island on the starboard hand; round Grave Islet, at any distance between 120 and 240 yards, and haul westward into the harbor.

Fogs are prevalent, and the risk of being suddenly enveloped in one while among so many shoals should always be borne in mind when about to take this channel.

Eastern entrance.—To enter Canso Harbor from the eastward the leading line of the Canso Harbor Leading Lights should be picked up about 4 miles eastward of Cranberry Island and ¾ mile northward of the light and whistle buoy off Grime Rock. The lights in line, bearing 266°, lead in, passing 200 yards north of Sand Shoal (30 feet) and 300 yards south of White Rock (24 feet), 400 yards south of Broad Shoal (9 feet), then through the narrow channel only 300 yards wide between Budget Rock (7 to 16 feet) and Frying Pan Reef, and 200 yards off the south end of Pas Reef; the line then passes close northward of Mackerel Rock, from which position the directions are given in preceding paragraph.

The least water along this range is 7 to 8 fathoms, but it will be seen that the alignment of the lights must be kept very closely for a distance of about 5 miles, to avoid many shoals which are not buoyed, and the risk in case of sudden fog obscuring the lighthouses must be borne in mind.

Ship Channel is considerably wider, with the dangers more visible or buoyed, and the additional distance to be traversed in taking that route from an easterly approach would be under 2 miles, but there are no range lights for the Ship Channel, nor are there range lights into the harbor from the alignment of lights for the eastern entrance.

Northern entrance.—To enter Canso Harbor from the northward: While seaward of Net Rocks, bring and keep the Roman Catholic Church steeple at Canso in range with the western side of Cutler Island, bearing 166°, which mark leads nearly midway between Bald and Whitman rocks; or the rear leading light at Canso in line with Cutler Island Light, 161° true, leads in until nearly abreast Bald Rock, when the northern end of Cutler Island must be steered for. The fairway bell buoy is passed close to. When the red clay cliff of Glasgow Head is in range with the middle of the channel between Cutler and Piscatiqui Islands, bearing 138°, steer for it, keeping in mid-channel, until Grave Islet Beacon is in line with Lanigan Beacon, bearing 165°; then steer with these beacons in line, passing between Starling Rock red buoy and the black buoy on the southeastern edge of the shoal off Cutler Island, when turn southwestward into the harbor.

Tides and tidal currents.—High water interval at Canso Harbor is 7h. 43m.; mean range 5.3 feet, spring range 6.5 feet. The flood is the north-going current, the ebb the south-going, but the velocity of the currents in the northern entrance of the harbor, where they are strongest, does not often exceed 1 knot.

The duration of the rise and fall, and also of the currents is probably influenced by winds.

Storm signals are displayed in Canso Harbor from a staff situated eastward of the Roman Catholic Church.

Lifeboat.—There is a lifeboat station at Lanigan Beach, on the south side of the harbor.

Wharves.—There are five small wharves, three of which have 16 feet of water at their heads.

Pilotage is not compulsory, and the rates are moderate.

Off-lying islands.—Hog, Cook, Welsh, and Derabie islands are small and, with many rocks, form a chain 1½ miles long east and west, terminating eastward with East Rock, which is of bare granite, 20 feet high and situated 1,200 yards northward from Crow Island. Rocks awash and shallow water continue 800 yards eastward from East Rock, but on the northern side these islands are steep to within

200 yards, excepting at their western end, where Black Rock and the shoal around it extend 400 yards northward from Hog Island. Black Rock, which seldom entirely covers, is ½ mile 48° from Bald Rock, and between them is the entrance to a channel running in from the outer islands and separating Piscatiqui and George islands, which is full of rocks and only navigable by boats. The outer islands are occupied by fishermen during the season, but the northern coast of George Island by more permanent residents. These islands are of granitic rocks, and most of them are sparingly wooded with dwarf spruce trees.

Canso Ledges.—East Rock lies 1¾ miles 334° from Cranberry Island Lighthouse, and a number of rocks, with deep water around, lie eastward of the line joining them.

Fanning and Scott rocks, with 12 and 9 feet least water, respectively, lie on the northeastern edge of Cranberry Island Bank, and ½ mile from the lighthouse.

Park Ledge, Crow Reef, and Budget Rock are nearly united by shoal water to Crow Islet and extend about 1,300 yards eastward and southeastward from it; Park Ledge is always above water. There is a deep channel between Budget Rock and Frying Pan, but it is narrow.

Kelp Rocks lie about 800 yards northward from the eastern end of Park Ledge, and there are depths of 12 to 16 feet of water over them; the sea only breaks on these rocks in heavy weather.

Inner Bass Reef, 1,400 yards 62° from Park Ledge, is awash at low water; the sea almost always breaks on it.

Middle Rock, 700 yards 115° from Inner Bass Reef, has 4 feet water over it, and is generally marked by breakers.

Broad Shoal, 1,400 yards 111° from the eastern end of Park Ledge, has a least depth of 9 feet on it, and it is marked by breakers when there is any sea.

NOTE.—The breakers on Middle Rock and Inner Bass Reef often serve as guides to fishing and coasting vessels, which prefer passing close to them and then entering Canso Harbor by eastern channel with the leading lighthouses, or their lights, in range, to going round outside Bass and Grime rocks, but this track is not recommended for large ships, for although the passage between Middle Rock and Bass Rock is 1 mile wide, yet Sand Shoal, with 30 feet, White Rock, with 24 feet, and three other patches of 24 to 30 feet, which lie southwestward of Bass Rock, render it unsafe in the heavy swell which so frequently prevails.

Bass Rock, 2¼ miles 58° from Cranberry Island Lighthouse, has a least depth of 6 feet of water, and the sea breaks frequently over it.

Grime Rock, 750 yards 24° from Bass Rock, has 12 feet least water, and is only marked by breakers when the sea is heavy; there is a 28-foot patch ¼ mile eastward of it. From Grime Rock, Cranberry Island Lighthouse bears 234°, distant 2½ miles, and the southern end of Grassy Island, the northern end of Petit-pas, and Park Ledge, are in line, and open a little southward of Crow Islet.

Grime Rock is marked on its northeastern side by a black spar buoy. This buoy is frequently adrift after a gale.

Bass and Grime rocks are the outermost of Canso Ledges, and being situated off a headland in a locality in which fogs are prevalent, caution is necessary in navigation.

Light and whistle buoy, painted black, showing an occulting white light, and fitted with an automatic whistle, is moored in 20 fathoms, with Grime Rock bearing 270°, distant 1½ miles.

This buoy is replaced for the winter each year by a black wooden spar buoy.

Carousse Bank, on which there is a least depth of 15 fathoms, rocky bottom, with 25 to 29 fathoms around, extends 1½ miles east and west, with a width of about ½ mile; from its shoalest part Cranberry Lighthouse bears 255° distant 7 miles.

Caution.—In approaching Cape Canso, or passing round its off-lying shoals in thick weather, great caution and the constant use of the lead are indispensable. If from the northward, remember that the shoals are only 800 yards southward of the 30-fathom edge of the bank; if from the southward and eastward, do not go into less than 25 fathoms until deep soundings indicate that the vessel is northward of the bank. In clear weather, do not haul westward into Chedabucto Bay until the high land of Black Point opens northward of Derabie Island, bearing 269°.

Fox Rocks lie off Lazy Head, between Durell and Fox islands, and dry at low water, the outer Fox being ½ mile offshore, and the same distance eastward from Fox Island. Neither of these rocks lies outside the line joining the northern ends of the islands, and they are therefore not much in the way of navigation.

The northern point of Fox Island and the pitch of Black Point in line clears the outer Fox in 5 fathoms; it also leads northward of the shoal off Tickle Island.

Fox Island, lying 2.3 miles westward of Durell Island, is granitic, ½ mile long, 350 yards broad, and 40 feet high. Rocks, above and below water, extend 400 yards off both ends of this island, which is connected with a shingle point of the mainland, 700 yards distant, by a bar of sand and stone nearly dry at low water.

Fisheries.—The shingle beaches on the mainland and on the southwestern side of Fox Island are covered with the huts of fishermen, who resort here in great numbers during the season, this being a principal fishing station, especially for mackerel and herring. The fishing vessels lie in Fox Bay to the westward of the island, in 4 to

7 fathoms, sand bottom; but this anchorage is insecure, being open to northerly winds, and also to the heavy easterly swell which occasionally rolls in round the reef. In northwesterly winds and fine weather the vessels sometimes shift to the eastward of the island, but the ground there is rocky, and the anchorage unsafe.

Half Island Cove, 4½ miles westward of Fox Island, affords a small and unsafe anchorage, being open to northeasterly winds and swell. There is a sunken rock 200 yards eastward of Half Island, the small island on the western side of this cove.

Philip Cove, 1¾ miles westward of Half Island Cove, affords shelter to boats, the sea being kept out by rocks in the entrance, which becomes dry soon after high water.

Queensport, noted for its mackerel and herring fisheries, is a mile westward of Philip Cove.

It has excellent holding ground and water enough for vessels of any draft, but there is not room for many large vessels in the eastern part of the harbor, which is the only part free from the heavy Atlantic swell which occasionally rolls in.

Rook Island, lying nearly in the middle of the entrance, is a rock 200 yards long, and Rook Rock, with 3 feet least water and deep water close to, lies 70 yards off the northwestern end of the island. The channel eastward of Rook Island, between it and Brodie Rocks, is 200 yards wide, and is generally preferred with easterly winds, although it has only 23 feet of water. Brodie Rocks, which dry at low water, form part of the reef which extends 450 yards from Lazy and Brodie points toward Rook Island, and shelters the eastern part of the harbor.

The channel westward of the island has 15 to 6 fathoms water in it and is 600 yards wide at the entrance between Rook and Corveau Rocks, which last are dry at low water, and form part of the reef off Lamb Point.

Lamb Point and the extremity of the land westward of it in line, bearing 282°, leads southwestward of Brodie Rocks and the shoal water within them on the northeastern side of the harbor.

Queensport Light, fixed white, is shown, 50 feet above high water, from a square white building, 40 feet high, on the middle of Rook Island. The keeper's dwelling it attached to the lighthouse.

A fog signal answers vessels' fog signals.

Directions.—In approaching Queensport from the eastward, to avoid the shoal which extends 300 yards off Lazy Point toward Rook Island, bring the eastern end of Rook Island to bear 213° and steer for it on that bearing until at the distance of 400 yards, then alter course as necessary to pass between 100 and 300 yards eastward of the island and continue to the southward until Lamb Point and the extremity of the land westward of it are in line, when haul in to the southeast and anchor in 6 to 7 fathoms, mud bottom.

In approaching the harbor from the westward, to avoid the shoal off Lamb Point and Corveau Rocks, bring the western end of Rook Island to bear 123° and keep it so until at the distance of ¼ mile, when alter course into the harbor, passing 200 yards westward and southwestward of the island, and observing the leading marks for clearing Brodie Rocks. Anchor in 6 to 7 fathoms, mud.

Tides.—It is high water, full and change, in Queensport at 8h. 00m.; springs rise 6½ feet, neaps 4½ feet. There is little or no tidal current within the harbor.

The shore.—At ½ mile westward of Lamb Point is the eastern of three remarkable high clay cliffs, after which the shore is hilly, bold, and rocky to Salmon River, the entrance of which is 8 miles westward of Rook Island; Halfway Cove affords a landing place for boats.

Salmon River is navigable for boats for 2 miles within its very narrow entrance, on the bar of which the depth is only 3 feet at low water. Shoal water extends ¼ mile off the entrance, and a rocky ridge with 4 fathoms least water for 1 mile eastward of it.

Bigby Head, a remarkable cliff 109 feet high, separates Salmon River from Toby Cove, a boat harbor, with 4 feet on its bar at low water.

Guysborough Harbor, at the head of Chedabucto Bay, and 1 mile northwestward of Bigby Head, is an extensive inlet, running in to the northward, with deep water inside the bars, but with a dangerous bar, a narrow and crooked entrance channel, and rapid tidal current.

The hills attain the height of 500 feet on either side of this beautiful inlet, which is navigable for ships up to the narrows, at 4 miles from the entrance, where the depth is 8 feet at low water; small vessels can proceed 3 miles still farther, and boats to the bridge at 8½ miles from the entrance, where the tide ends and where Guysborough River, a small stream, enters the inlet after flowing through rich meadows called the Guysborough Interval.

Guysborough Light, fixed white, 38 feet above high water, visible 11 miles, is exhibited from a square white building with red roof, 35 feet high, at the southern end of the shingle beach of Peart Point, on the western side of Guysborough Harbor entrance.

A fog signal at the lighthouse answers vessels' fog signals.

Outer and Inner Bars.—The entrance channel into Guysborough Harbor, between Peart Point and Stony Patch, is 80 yards wide, and carries 26 to 40 feet water; but the Outer Bar, of sand, with 16 feet on it at low water, and which is impassable at times on account of the heavy breakers, lies farther out and stretches across from Toby Point to Hadley Beach.

The Inner Bar lies across the inner entrance, which is 230 yards wide, between Eliza Point and Hadley Beach. The depth which can be carried over it is 13 feet at low water in a channel only 80 yards wide. Southwestward of this bar there is room enough for a vessel or two to anchor in the mouth of Ingersol Creek, out of the strength of the tidal stream, and sheltered from the sea by Stony Patch.

Beacon.—A beacon, consisting of a truncated cone of concrete sheathed with timber, surmounted by a pole with ball at its top, 20 feet high, the pole and ball being painted white, and the timberwork unpainted, stands on the summit of Stony Patch.

Buoys.—A can buoy, painted in black and white vertical stripes, is moored off the entrance to Guysborough Harbor, 900 yards, 99°, from Peart Point Lighthouse; a red conical buoy is moored 270 yards, 55°, from the lighthouse, on the edge of the shoal, nearly 200 yards southward of Stony Patch Beacon; a black can buoy on the extremity of the shoal running northeastward from Eliza Point; a black spar buoy on the edge of the shoal northward of Eliza Point; and a black spar buoy marks the end of the shoal extending from Bryon Island above the town.

Directions.—To cross the Outer Bar in the deepest water, bring Guysborough Harbor Lighthouse to bear 270°; steer for it on that bearing until at the distance of 200 yards, then curve gradually northward and eastward, passing the beach off Peart Point at the distance of 60 yards, and crossing the mouth of Ingersol Creek to the Inner Bar. Steer about 33° for 200 yards while crossing that bar, and then turn northwestward through a clear and deep channel for ¾ mile to the safe and spacious anchorage off the town.

The red buoy southward of Stony Patch is left on the starboard hand, and the black buoys off Eliza Point on the port hand, entering.

The assistance of a pilot acquainted with the tidal currents is indispensable for the safety of a vessel even of very moderate size, either in entering or leaving this harbor.

Tides and tidal currents.—High water interval at the entrance to Guysborough Harbor is 8h. 05m.; spring range 6.4 feet, mean, 5.2 feet. The velocity of the currents in the narrow entrance of the harbor is 4 to 5 knots.

Guysborough, the county town, with a population of about 1,600, is advantageously situated on the western side of the harbor, about ¾ mile within the entrance, the deep water approaching close to its wharves. Fishing is the principal industry.

Guysborough to Cape Argos.—From Guysborough Harbor entrance, the shore of the bay trends east-northeastward about 10 miles, to Oyster Point, and thence northeastward 2 miles to Cape Argos. The prevailing features of this shore are peninsulated points of drift sand, clay, and bowlders, resting on sandstone, and presenting low cliffs to the sea. These are united to the mainland by beaches of shingle, inclosing large ponds, several of which admit boats at high water when the surf is not too heavy. Within these ponds, and situated on the southern slope of ridges about 200 feet high, are the houses of a scattered population, who subsist by fishing and farming.

Moose Point lies 2.9 miles 57° from Guysborough Lighthouse, and a rocky bank, on which there are depths of 19 to 28 feet at low water, extends 1,200 yards out from the shore midway between them.

Moose Bay.—Ragged Head bears 78° 2¼ miles from Moose Point, and Moose Bay, which lies between them, is ¾ mile deep. This bay forms a semicircle, with a shingle beach, unbroken excepting by the shallow outlets of ponds, and it affords anchorage in 5 to 7 fathoms, sand and mud bottom, but it can be considered safe only in fine summer weather, on account of the heavy swell which accompanies easterly gales. A flat of sand extends nearly ½ mile off the eastern side of the bay.

Ragged Head, which is remarkable, and appears as an island from a distance, is a rocky peninsula, forming the apex of a triangle, the sides of which are long shingle beaches, inclosing Ragged Pond, which has an area of about 180 acres, with 15 to 34 feet depth of water, but boats can enter it only at high tide by a narrow channel on its western side. The surface of the pond is 3 feet higher at low water than the water outside; the depth in the channel is about 3 feet at low water, except near the entrance, where it is about 1 foot.

The shore from Ragged Head trends eastward 4 miles to Grady Point, and thence 1¾ miles to Oyster Point, and thence northeastward 2 miles, to Cape Argos.

Murdoch Ledge, dry at low water, and ½ mile offshore, lies midway between Grady and Oyster points.

Hydra Shoal, a rock with a depth of 12 feet water over it, lies 1.3 miles, 129°, from Grady Point. The part of the shelf on which there is less than 3 fathoms is only 200 yards across, but there is less than 5 fathoms over a much larger space. There is a depth of 6 to 8 fathoms between it and the land and 10 to 12 fathoms southward and eastward of it at the distance of ¼ mile.

Thomas head, open eastward of Cape Argos, 18°, leads eastward of Hydra Shoal.

During the heavy easterly swell so frequent in this bay the position of this shoal is marked by heavy breakers; at other times it must be approached with caution, especially from the southwest, as on that side there are no good leading marks.

Cape Argos is a small peninsula, 92 feet high, bare of wood, with red cliff, and united to the mainland by a low isthmus of shingle. Off the point of cliff next northward of the cape and distant 600 yards from it a reef runs off toward Argos Shoal, which it so nearly joins as to leave no passage for vessels of large draft.

Argos Shoal, of rock, extends 1,400 yards eastward from the point 600 yards northward of Cape Argos, and the least water on it is 20 feet. It is marked by heavy breakers when there is a swell from the southeastward.

A black whistle buoy, marked "C. Argos," is moored in a depth of 10 fathoms, 500 yards eastward of the eastern extremity of Argos Shoal.

Eddy Point and Flat Head in line, and with the eastern side of a hill behind Flat Head, also in line, bearing 323°, leads 300 yards northeastward of the shoals off Cape Argos, in 7 to 8 fathoms. Flat Head is the northeastern point of Bear Cove.

The shore from Cape Argos trends northward 2½ miles to Eddy Point.

Michaux Point, the northeastern point of Chedabucto Bay, is a peninsula, united to the mainland of Cape Breton Island by a double beach, inclosing a pond; Red Point, ¼ mile off which is Red Island, lies 2¼ miles westward from it. Michaux Ledges, dry at low water, and usually shown by heavy breakers, extend across the bay between these points and nearly a mile from the shore with deep water close to them.

The southwestern point of St. Peter Island and Mark Point in line 302°, leads close southwestward of Michaux Ledges, in 4 fathoms.

Breakwaters.—An isolated breakwater has been built off Martin Point, at about 1 mile northward of Red Point; it is 400 feet long, and in 1 to 4½ feet at low water. Another isolated breakwater, 300 feet long, protects the fishing boat anchorage in the cove which forms the western end of the settlement of L'Ardoise.

L'Ardoise Range Lights.—The front light, fixed red, elevated 20 feet, is shown from a white square wooden tower with sloping sides and square lantern, 22 feet in height, erected on the beach 300 yards northward of Martin Point.

The rear light, fixed red, elevated 52 feet, is shown from a similar tower, situated 300 yards, 43°, from the front light.

These lights in line, bearing 43°, lead to the anchorage, passing about 100 yards westward of the breakwater extending from Martin Point.

Bell buoy.—A black bell buoy, marked "L'Ardoise" in white letters, is moored, in a depth of 10 fathoms, at 1.1 miles southwestward of Martin Point.

Storm signals.—There is a storm signal station at Martin Point.

L'Ardoise village, the church of which has a steeple, is situated on the northeastern shore of the shoal bay between Red Point and St. Peter Island.

Shaw Cove, about 1 mile westward of L'Ardoise, is very shoal, but it accommodates a large number of small fishing boats.

St. Peter Island lies about 3 miles 300° from Red Point; it is about 50 feet high, and about ¾ mile long. The cove on its northern side is one of the principal fishing stations in these parts, and affords shelter to numerous small craft and boats. The island is bold to seaward, but ¼ mile off its northwestern side is Haddock Rock; in the bay between it and Mark Point there is much shoal water, leaving, however, a clear channel within Horseheads and Samson Rocks into St. Peter Bay.

Madame Island—Southeastern coast.—Cap Rond, the eastern point of Madame Island, bears 250°, 3¼ miles, from St. Peter Island, and the eastern entrance of Lennox Passage lies between them. The cape is a remarkable red clay cliff, 60 feet high. Shallow water extends about 800 yards off the coast, trending southward from it.

Madame Island Light, flashing white, 92 feet above high water, visible 15 miles, is exhibited from a square white tower, 28 feet high, with a dwelling attached, on Cap Rond.

Beak Point lies 1¼ miles southward from Cap Rond. Shoal water extends 400 yards from the point, but off it there is much rocky and irregular ground, on which the sea is said to break occasionally in heavy gales. The least water found is 4 fathoms, on a patch 1½ miles, 102° from the point, and a patch of 4½ fathoms lies 1.1 miles, 74° from the point. Except in a vessel of small draft, pass outside this rocky ground, especially when there is a heavy sea.

A black whistle buoy, marked "Beak Point Shoal," is moored, in 8 fathoms of water, on the eastern side of the shoal on which the least depth is 4 fathoms, known as Petit Nez Shoal.

Bay of Rocks, lying between Beak Point and Gros Nez, a rocky islet off the eastern end of Petitdegrat Island, is 3 miles wide, and deep. It is open to all easterly winds, which send in a heavy sea, and affords no safe anchorage. Bewes Shoal, with 21 feet least water, lies nearly in the middle of the bay, and besides the low Rocky Islets near its head, there are many other rocks around and off its shores.

There is a small fishing station at Gros Nez on the eastern end of Petitdegrat Island.

Red Head, the southeastern end of Petitdegrat Island, is a remarkable cliff, 70 feet high. Shallow water extends ¼ mile off it, to clear which, keep Beakpoint open eastward of Flat Point.

Green Island, 1 mile 105° from Red Head, is 700 yards long, west and east, and 300 yards broad. It is of slate, precipitous, bold all round, and there is a clear channel ¾ mile wide between it and Red Head..

Green Island Light, group flashing white, 111 feet above high water visible 16 miles, is exhibited from a square white tower in the middle of the keeper's dwelling, 31 feet high, on the summit of Green Island.

Orpheus Rock (called Boss by the fishermen), situated 1¾ miles 90° from Green Island Lighthouse, is small, awash at low water, with deep water all around, and the sea almost always breaks on it. At 200 yards southwestward of it the depth is 50 fathoms.

A black buoy is moored on the eastern side of Orpheus Rock.

Heath Head, the southern point of Petitdegrat Island, situated 1 mile westward from Red Head, open northward or southward of Green Island, leads clear, northward or southward, of this rock.

Petitdegrat Inlet, separating Petitdegrat Island from Madame Island, is a very narrow channel, 2 miles long, with water enough for vessels of moderate size, but the rocks are so numerous and the channel so narrow as to render the aid of a native pilot indispensable. The principal entrance is at the southern end of the inlet; the northern entrance from Bay of Rocks is obstructed by outer and inner bars through which passages for boats have been opened. The fisheries are extensively prosecuted from this inlet, and its shores, as well as almost every cove in Petitdegrat Island, are occupied by the fishermen.

Petitdegrat Light, fixed red, is shown, 38 feet above high water, from a square white tower, 31 feet high, with a dwelling attached, on Mouse Island, on the eastern side of Petitdegrat Inlet.

A fog signal at the lighthouse answers vessels' signals.

Light and bell buoy.—A black and white vertically striped cylindrical light and bell buoy is moored in a depth of 10 fathoms, with Mouse Island Lighthouse bearing 38°, distant about 1,800 yards, and shows an occulting white light.

The eastern side of the entrance is marked by a red conical buoy moored on the western side of Big Arrow Rock.

Cape Hogan, the southern point of Madame Island, is the termination of a bold and remarkable headland, with cliffs 100 feet high.

Cerberus Rock, just awash at low water, with deep water all around, lies directly in the fairway to and from the Gut of Canso, and it bears 182°, 2½ miles, from Arichat Head, the southwestern end of Crichton Island; there are almost always either breakers or a rippling over the rock.

A red cylindrical light and whistle buoy, marked "Cerberus," is moored in a depth of 22 fathoms, 500 yards, 156°, from the rock, and shows an occulting red light.

Green Island, just open southward of Cape Hogan, bearing 80°, leads about ½ mile southward of Cerberus Rock; Arichat Anglican Church steeple and the eastern end of Western Jerseyman Island in line, 50°, leads 200 yards southeastward; either Carleton Head open westward of Wasting Islet, or Eddy Point and Ship Point in line, 306°, leads 1 mile westward, but these marks are too distant to be often distinguished.

Directions.—To pass southward and westward of Cerberus Rock keep Green Island just open southward of Cape Hogan until Arichat Anglican Church is seen over the shingle isthmus uniting Eastern and Western Jerseyman Islands, or until Arichat Head bears 10°, when steer a course for the Gut of Canso.

When bound southward observe that the course made good from the middle of the southern entrance of the Gut of Canso must not be eastward of 133° until Green Island opens southward of Cape Hogan, or until the Anglican Church steeple is seen over Jerseyman Isthmus, when the rock is cleared.

Arichat Harbor is capable of securely containing a large number of vessels, being sheltered by Jerseyman Island, which stretches across the bay. The harbor is about 2 miles in length, east and west, and about ½ mile in width. It has two entrances, of which the northern is the least difficult, although only 200 yards wide; the southern entrance is 600 yards wide, but it lies between shoals.

Slates, sandstones, conglomerates, and traps, probably upper Silurian rocks, predominate around Arichat, and the country has a sterile appearance, arising as much from the neglect of agriculture as from the nature of its soil and the unfavorable climate. In common with the Atlantic coast of Nova Scotia and Cape Breton Island, vegetation is retarded in a much greater degree than in places of the same provinces that are situated within the Gulf of St. Lawrence by the easterly winds which usually prevail in May and June, and bring rain and fog from a cold and frequently icy sea.

Depths.—The least water in the northern entrance is 9 to 10 fathoms, and 7 fathoms in the southern entrance; in the harbor there is 7 to 10 fathoms throughout the greater portion of its area.

Marache Point, on the eastern side of Arichat Harbor southern entrance, is steep to the westward, with the exception of two small rocky patches which lie 600 and 800 yards westward of it, and on which the least water is 4 fathoms. Northward of the point, and for some distance to the eastward, shoal water extends 300 yards offshore.

Arichat Harbor Light, fixed white, 34 feet above high water, visible 8 miles, is exhibited from a square white tower, 25 feet high, on Marache Point.

A fog signal answers vessels' signals.

Beach Point Light, fixed red, at 39 feet above high water, visible 11 miles, is exhibited from a square white tower 28 feet high with a dwelling attached on Beach Point, the northern point of West Jerseyman Island.

A fog signal answers vessels' signals.

Hautfond Shoals are a chain of rocky patches lying in a line 252° 1,800 yards from the northern side of Forest Cove, which is situated about 700 yards southeastward of Marache Point. There is a depth of 10 feet on the outer patch, and the least water on the other patches is 21 feet. There is deep water between the patches, but the safe navigable channel is westward of them.

Mariners without local knowledge should not pass between Hautfond Outer Shoal and the land eastward of it.

A red can buoy is moored in 6 fathoms 200 yards southwestward of the outer patch.

A beacon on the southeastern point of East Jerseyman Island, in line with the cupola of the convent 20°, leads northwestward of these shoals. Cape Hogan and the southern end of Green Island in line leads 700 yards to the southward.

Capodiette Bay.—Kavanagh Point lies 1½ miles 27° from Marache Point Lighthouse, and Capodiette Bay, situated between them, although open to westerly winds and to the heavy swell rolling in at times from the southward, affords tolerably good occasional anchorage in 10 to 12 fathoms, mud, the best ground being in the deepest water.

Buoys.—A red spar buoy is moored in 4 fathoms water, nearly 200 yards northwestward of the lighthouse.

A red spar buoy marks the northeastern edge of the shoal water extending offshore for about 1,600 yards northeastward of Marache Point.

Fiddle shoal, with 10 feet least water, lies at the outer end of the rocky bank, which extends 600 yards westward of Kavanagh Point. There is no passage for large vessels between it and the point, which has several dry rocks off it and shoal water for 300 yards off the shore southward of it. A reef with 3 feet over it at low water runs ¼ mile off the northern side of Kavanagh Point within the harbor and halfway across to the wharves of Arichat Town.

A red spar buoy is moored in 3 fathoms on the western edge of Fiddle Shoal.

A beacon stands on the northern side of the reef at about 2 cables northward of Kavanagh Point, and red poles are erected on the edge of the shoal about 200 yards eastward and westward of the beacon.

Henley Ledges are black rocks covered only at high water, and almost always shown by breakers, situated on the northwestern side of the southern entrance to Arichat Harbor, and near the southwestern end of the rocky bank extending about 1,300 yards from Jerseyman Island. Shallow water extends 300 yards seaward of the ledges, but a rock awash lies about 700 yards northwestward of them, and two others betwen the ledges and Jerseyman Island, thus leaving no passage for ships.

A black spar buoy is moored in 11 fathoms water at the southeastern end of Henley Ledges.

There is no good mark leading southwestward of these rocks; the Anglican Church steeple, just open southeastward of East Cliff, East Jerseyman Island, 37°, leads southeastward of the ledges.

Pilot Rock, at the end of the shallow water stretching eastward of East Jerseyman Island is small, with 4 feet least water, and quite bold to the southward. There is no channel between it and the island except for small craft.

A black pole, in 30 feet of water, marks the eastern side of Pilot Rock.

A solitary conspicuous barn in line with Kavanagh Point leads very close southeastward of the rock.

Poule Reef, with 7 feet least water, lies about 400 yards 52° from Poule Islet, which is nearly united to the eastern end of East Jerseyman Island at low water. There is a narrow channel, fit only for small craft, between the shoal and the islet, but the ship channel between this shoal and the Fiddle is 600 yards wide, from the depth of 3 fathoms to 3 fathoms on either side, with water sufficient for large ships.

There are some patches with 25 to 30 feet water over them in the southern entrance to the harbor, the positions of which are shown on the chart.

A black pole beacon, in 26 feet water, marks the eastern end of Poule Reef, and a similar beacon marks the western end of the reef.

Crid Pass is between the northern end of West Jerseyman Island and Crid Islands.

Crid Islands, small and rocky, form the northern side of Crid Pass, the breadth of which across to Beach Point, the northern end of West Jerseyman Island, is about 300 yards, but half tide rocks off both ends of Crid Islands reduce the navigable breadth of the channel to 200 yards.

Shoal.—There is deep water off Beach Point, which is all shingle, at the distance of 60 yards, but southwestward of the point, shoal water commences and increases in distance from the shore to the western end of West Jerseyman Island, where it extends 700 yards westward from the cliffs, and still farther southwestward; to the southward it unites with Henley Ledges.

A conical red buoy is moored on the western edge of the shoal off West Jerseyman Island, with the western end of that island bearing 86°, distant 800 yards.

Directions—Southern entrance.—When bound to Arichat from the eastward, pass Hautfond Shoals by keeping the southern end of Green Island in range with Cape Hogan, or open of it, until the beacon on Jerseyman Island is in range with the cupola of the convent; keep that range until the lighthouse on Marache Point bears 120°, thence steer 63°, so as to make a direct course toward Little Barachois, at the head of Capodiette Bay, and when the Roman Catholic Church bears 340° (the road just westward of the church is then open), run toward it until the southern end of Crichton Island opens northward of Beach Point.

Then haul to the westward, and anchor anywhere northward of the line from Poule Islet to Beach Point. Southward of that line, in the bight of Jerseyman Islands, is Cage Shoal, with only 7 feet ot water, and much foul ground.

To go to the eastern part of the harbor, stand well over to the northern shore, and run to the eastward along it 200 yards from the ends of the wharves, until Marache Point is shut in by Kavanaugh Point, when there is deep water and bold shores to 250 yards from the entrance of the cove at the head of the harbor.

The foregoing, with the assistance of the buoys, are safe directions, but with local knowledge it might be convenient to pass eastward of Hautfond Shoals, with the Roman Catholic Church and Marache Point in range, bearing 2° until ¼ mile from the point; then, after rounding the point and the shoal water off its northern side, proceed as above directed.

Northern entrance.—From the westward, after passing Peninsula Shoals, keep Bear Head open of Peninsula Point until the Roman Catholic Church at Arichat is open southward of Crid Islands, to clear Crichton Shoal; this mark also leads clear of Picard Reef, and of the shoal water off Crichton Island. Avoid also Cerberus Rock.

Having passed Crichton Shoal, bring the Roman Catholic Church to bear 72°, when it will be in line with the middle of Crid Pass. Keep it so until in the pass, then round Beach Point at any distance between 60 and 200 yards, and steer into the harbor.

Tides and tidal current.—High water interval at Arichat is 7h. 55m.; spring range 5 feet, mean range 4 feet, but extraordinary springs may rise 6 feet. The flood current comes in by the southern entrance and runs through the harbor to the northward and westward; the ebb current sets in contrary directions. These currents are not very regular, and the velocity seldom exceeds 1 knot.

Arichat Town is straggling, but well placed, and extends nearly 3 miles along the steep northern shore of the harbor, where there are many wharves and stores. There are two churches, the western, Roman Catholic, is the largest, and has a spire; the convent, 130 yards eastward of this church, has a cupola in the middle of the roof. The

Anglican Church, which is near the middle of the village, has a small cupola, but is not very noticeable, and the only other public building at all remarkable is the courthouse, standing more to the eastward, and distinguished by its porch on pillars.

The Government wharf at Arichat is 144 feet long and 30 feet wide, with an "L" 90 feet long and 50 feet wide, on which is placed a warehouse; the channel face of the wharf has a length of 120 feet, with a depth of 19 feet at low water.

There is a very good wharf at Robin Point, on the southern side of the harbor, with a depth of 20 to 30 feet of water at a distance of 20 feet from it.

Arichat is the headquarters of the fisheries in this locality, and the most important seaport on the Atlantic coast of Nova Scotia eastward of Halifax.

A considerable quantity of gypsum is produced from the mines at Arichat.

Water.—The usual watering place is at a spring near Hubert's Wharf, where good water may be obtained at a small charge. Water may also be obtained at Irish Point, from the outlet of the chain of small lakes in the rear of the town.

Picard Reef extends 400 yards southwestward from the southern point of Crichton Island.

Crichton Shoal, bearing 246°, distant 1,400 yards from Arichat Head, is rocky, with a least depth of 11 feet of water over it.

A can buoy, painted red and black in horizontal stripes, is moored on the middle of Crichton Shoal.

The Roman Catholic Church at Arichat, open southward of Crid Islands, bearing 76°, leads ¼ mile southward of the shoal and also southward of Picard Reef; Bear Head and Peninsula Point, in line 293°, lead about 600 yards southwestward of the shoal; and Bosdet Point northern extremity with wharf just open northward of Crichton Island, bearing 61° 600 yards, leads nearly 400 yards northward of it.

Little (West) Arichat, situated northeastward of Crichton Island and 2 miles westward of Arichat, is a small and secure harbor, where the fisheries are extensively prosecuted. The approach is from the westward and leads over a bar with 15 feet at low water, which extends northwestward from Arichat Head, the western end of Crichton Island. The entrance of the inner harbor, ½ mile within this bar, is 300 yards wide between Crichton and Bosdet points, Crichton Point being a long spit of sand and shingle, with stores and a wharf, on the northern side of Crichton Island. There is also a wharf extending about 240 feet southward from the southern extremity of Bosdet Point. The eastern end of the harbor is closed by a bar of shingle, which dries at low water. There is secure anchorage immediately within the entrance in 3½ fathoms.

Crichton Head Light, occulting white, is shown, 29 feet above high water, from a square white tower, 20 feet high, on Crichton Head, the northwestern point of Crichton Island.

West Arichat light, fixed white, is shown from a white pole erected on the outer end of the wharf extending from the southern extremity of Bosdet Point.

Arichat Range Lights.—A fixed red light is shown, 29 feet above high water, from a white square tower 27 feet high, on land 3 feet high, and situated about ¼ mile northward of Bosdet Point.

A fixed white light is shown 37 feet above high water from a similar tower 33 feet high, and situated on Madame Island 600 yards 62° from the front light.

The lights in line, 62° true, lead through the channel into Little Arichat Harbor.

Buoys.—A red conical buoy marks the southeastern side of the bar channel and a black spar buoy the northwestern side.

Directions.—Approach with the wharf on the northern end of Bosdet Point bearing between 78° and 72°, or with the range lighthouses in line, which leads over the bar in not less than 15 feet at low water. Keep the same course until the inner end of the wharf extending from the shingly southwestern end of Bosdet Point and the eastern end of Crichton Island are in range, bearing 113°. Steer with the last mark on until Bosdet Point is 300 yards distant and the shingly eastern end of Crichton Point bears 191° 200 yards distant; then alter course southward, passing two-thirds of the distance over from Crichton Point toward Bosdet Point and into the harbor.

At night approach with the range lights in line, and when West Jerseyman Island Light in line with the pole light on the extremity of wharf south of Bosdet Point bears 111°, approach on this line and round the wharf into the harbor.

Le Blanc and Haddock Harbors.—Le Blanc Harbor entrance, which is very narrow, and in which there is a depth of 6 feet of water, lies northeastward of Bosdet Point. There is deeper water within. The harbor is extensive, and on its shores is a population of fishermen and small farmers.

At the northwestern extremity of Le Blanc Harbor is Mousselier Pass, very narrow, between mussel beds, and only 1 foot in it at low water; boats go through it into Haddock Harbor. The principal entrance to Haddock Harbor is from Lennox Passage, by a very narrow channel to the eastward of Campbell Island, which has 20 feet in it at low water. Le Blanc and Haddock harbors are occasionally resorted to by small craft in the fishing season, but they are no use to large vessels.

Janvrin Island, situated westward of Madame Island, and separated from it by Mousselier Pass, is about 2.6 miles long northeast and southwest, 1½ miles wide, and is surrounded on the southern and western sides by shoals, which extend in places ½ mile offshore.

Deep Cove and Janvrin Harbor, in the bay between Arichat Head and Peninsula Point, are barred by Dorey Ledge, and are only suitable for small craft and boats. In the entrance of Janvrin Harbor, and 1½ miles eastward from Peninsula Point, lies Delorier Island.

Bentinck Shoals.—The rocky Bentinck Shoals extend about 1,200 yards southwestward from Delorier Island and join Peninsula Shoals to the westward; the least water on them is 4 feet.

Peninsula Shoals run off about 1,800 yards southeastward from Peninsula Point. In the southeasterly direction the reef dries out 600 yards, while in a more southerly direction there are 6, 16, and 25 feet, at distances of ¼, ½, and ¾ mile from high water mark.

A red bell buoy, marked "Peninsula Shoals," is moored in a depth of 10 fathoms about 1,000 yards, 188°, from the southern extremity of Peninsula Point.

Ship Point and Bear Island in line, bearing 301°, lead southwestward of these shoals in 6 fathoms water; and Arichat Roman Catholic Church in line with the southern side of Crichton Island, 81°, leads about 800 yards southward of them.

Peninsula Point and Wasting Islet, appear like two small islands and lie on the edge of the bank which dries out from the southwestern side of Janvrin Island; the islet is to the northwestward. Both have low red cliffs to seaward, and long gravel spits at their northwestern points; but a long bar of shingle unites the peninsula at its eastern end to Janvrin Island. Very shallow water extends 400 yards off Wasting Islet, with a depth of 4 to 5 fathoms for a similar distance farther southwestward.

Janvrin Shoal, extending nearly 1,400 yards westward from Janvrin Point, is a bank of sand and stones which dries out half of that distance. There is a large rock near its drying edge, and 1,100 yards from the point there is a rock with 6 feet least water over it.

A red conical buoy is moored in about 12 fathoms water westward of the shoal.

The southwestern side of Wasting Islet in line with the northeastern end of Peninsula Point, bearing 109°, leads 200 yards southward of this shoal in 5 fathoms of water. On the northwestern side, where there are no clearing marks, it should be approached with great caution, for the water is too deep for the lead to afford much warning.

Thomas Shoal extends ¾ mile westward from Thomas Head, the northwestern point of Janvrin Island, and there are rocky and irregular soundings of 11 to 21 feet at low water over it.

The eastern end of Wasting Islet in line with the western end of Peninsula Point, bearing 131°, leads about 300 yards southwestward of the shoal; and Campbell Island, just open northward of the northern side of Janvrin Island, bearing 74°, leads close northward of it.

LENNOX PASSAGE.

Lennox Passage, between Cape Breton Island and Madame and Janvrin Islands, is 15 miles in length, with a width varying from about 1¾ miles to 300 yards and a depth of 18 feet at low water in its shallowest part. A great part of the channel is so narrow, crooked, and full of shoals that navigation is intricate, and in a large vessel requires local knowledge. The channel, therefore, is seldom taken by large vessels, and it is well to note that the knowledge of such pilots as can be obtained is said to be questionable. It is, however, a safe and smooth water channel for coasting vessels, and it affords an advanced anchorage from which a sailing craft can start with a fair wind when bound southeastward to sea. These vessels, with a draft not exceeding 12 feet, run through with a leading wind and at a proper time of tide.

The plan is the best guide, and the description herein is brief.

Note.—It is very difficult to be sure of the color of the buoys in Lennox Passage until close to them.

The eastern entrance of Lennox Passage between St. Peter Island and Cap Rond is 3¼ miles wide. The shoals off St. Peter Bay occupy much space but still leave a clear channel 1 mile wide between them and Cap Rond. This channel leads to the only anchorages in this locality—those off the northern side of Bernard Island, or off the eastern entrance of Poulamon Bay—which can be run for on the approach of bad weather.

Horsehead Shoals, on the northeastern side of this channel, are rocky, irregular in shape, and about 1 mile in extent, both north and south and east and west. Besides several shallow patches occasionally marked by breakers, Three Rocks, near the northern side, only just uncover at low tides, and the sea usually breaks heavily over them.

Horsehead Shoals are marked by a red can buoy at the southwestern end, by a black spar buoy at its southeastern edge, by a black spar buoy at the northeastern end, and by a red spar buoy at the northwestern end. The 3-fathom curve inclosing the shoals extends 200 yards northward of the line joining these two latter buoys.

The northern ends of Cascarette and Ouetique islands in range, bearing 272°, lead over the northern end of these shoals in 18 feet of water. The beach of Beak Point in range with Cap Rond, 194°, leads northwestward, and the southwestern end of Ouetique Island and Savage Point in range, when Cascarette Island is just open southwestward of them, bearing 284°, leads close southwestward of the shoals. If Savage Point can not be made out, keep Cascarette Island open at least 2° southwestward of Ouetique; do not approach this shoal nearer than the depth of 10 fathoms.

Samson Rocks lie ½ mile northwestward of Horsehead Shoals and off the mouth of St. Peter Bay. Two of these rocks dry at low water, and there is a considerable extent of shoal ground around them.

Samson Rocks Shoal is marked by a red can buoy at its southwestern end, in 3 fathoms, by a red spar buoy on its northern side, and by a black spar buoy at its northeastern end.

A red spar buoy is moored at the western end of the shoal ground off Mark Point.

The northern ends of Cascarette and Ouetique islands in line lead southward of Samson Rocks Shoal, in 3½ fathoms.

St. Peter Bay runs in about 2¼ miles northward of Samson Rocks; its entrance is 1.1 miles wide. The bay may be approached either east or west of Horsehead Shoals and Samson Rocks. It has excellent anchorage, especially at Grande Grève, on its eastern shore, but numerous rocky shoals are scattered over the bay. Vessels entering the bay must use the plan as the guide, unless they have local knowledge. The channel principally used is that westward of the middle ground.

The chief settlements are at Grande Grève and along the southern side of Jerome Point, a headland projecting from the northeastern side of the bay and rising to the summit of Granville Hill, on which are the remains of an old fort 190 feet above the sea. Vessels usually anchor in that part of the bay lying within Jerome Point, where there are the remains of another old fort.

Jerome Point Light, fixed red, 56 feet above high water, visible 8 miles, is exhibited from a square white tower 40 feet high on Jerome Point, near the entrance to St. Peter Canal.

A fog signal answers vessels' signals.

Buoyage.—Red spar buoys are moored at the western and at the northwestern ends of the spit extending about 1,300 yards northwestward from Mark Point, on the bank, and at the northern end of the spit on the western side of Grande Grève. Black spar buoys are moored on the small detached shoal bearing 271°, distant 1,200 yards, from Mark Point; on the southern and northeastern ends of the middle ground; at the southeastern end of the detached shoal bearing 325°, and at the eastern end of the shoal bearing 342°, both distant 1,800 yards from Mark Point; and on the northeastern edge of a shoal 600 yards 274° from Jerome Point Lighthouse.

The shoals extending off the northwestern side of the entrance are marked by a black can and a black spar buoy, and on the northern side of the middle ground is a red spar buoy.

St. Peter Canal connects Bras d'Or Lake with St. Peter Bay.

Tides.—High water interval in St. Peter Bay is 7h. 15m.; spring range 6 feet, mean range 4.9 feet.

Bourgeois Inlet.—There are several remarkable cliffs of red clay immediately westward of St. Peter Bay; the western of them is on Bisset Island, which forms the eastern point of the narrow entrance to Bourgeois Inlet, an extensive arm of the sea, with 12 feet at low water in its mouth. Stores and wharves and a chapel are erected on the eastern side, a short distance within the entrance. The fisheries, shipbuilding, and agriculture give employment to a number of persons, principally Acadians, who are settled around the inlet.

Bourgeois Inlet Light, fixed white, 25 feet above high water, visible 10 miles, is exhibited from a square white dwelling, 27 feet high, immediately inside the high water mark of the low gravel point on the eastern side of the mouth of the inlet and at the narrowest part of the channel.

Ouetique Island, 1 mile southwestward of Bourgeois Inlet, is 270 yards long north and south, 100 yards wide, precipitous, dark-looking, 45 feet high, with a few pine trees upon it; the passage between Ouetique and Bisset Islands is full of shoals, of which Philip Rocks are awash at high water.

Ouetique Island Light, fixed red, 78 feet above high water, from a square white tower, 28 feet high, with keeper's dwelling attached, on the southern point of Ouetique Island.

A fog signal answers vessels' signals.

Cascarette Island, 1,100 yards westward of Ouetique, is 670 yards long east and west, 300 yards wide, 35 feet high, wooded, with low cliffs at its northeastern and a sandy point at its southwestern ends. Shallow water extends 200 yards from the southern points of both Ouetique and Cascarette Islands, but there is a half-tide rock between them, from which shoal water extends 500 yards southwestward.

The passage between Cascarette and Bernard Islands is ¾ mile wide, but a rocky bank with 18 feet least water in the middle of it contracts the deep-water channel on the southern side of the bank to 400 yards in breadth.

Goillon Reef, which dries at half tide, lies about ½ mile southwestward of Cascarette Island, leaving a clear channel between into the extensive inlet of Couteau, which is situated northwestward of it.

An octagonal concrete beacon, 15 feet high, is erected on Goillon Reef and a red spar buoy is moored on the southern edge of the reef.

Moulin Point, open southward of Birch Point, bearing 263°, leads southward of Goillon Reef.

Indian Creek and Couteau Inlet.—The common entrance to Indian Creek and to Couteau Inlet is between Cascarette Island and Birch Island; the inlet runs in 3 miles northwestward and is navigable by large vessels.

Birch Island forms the northern side of the passage for the distance of 1 mile to Grande-digue.

Birch Shoal, the only detached shoal in this part of the channel, is situated 270 yards southwestward of Birch Point, which projects from the southern side of Birch Island about 1,600 yards from its eastern end. Soundings of 13 feet have been obtained on this shoal, but as there may be less water it should not be passed over.

A red and black spar buoy is moored on Birch Shoal.

Cap Rond is the western point of the eastern entrance of Lennox Passage. The shallow water, which, northeastward of the cape, runs off only ¼ mile, widens northwestward off the long shingle beach of Goulet and may be considered continuous to the northeastern end of Gabion Shoal, situated 316°, distant 2.1 miles from Cap Rond.

Gabion Shoal is rocky, and the least water, 5 feet, is on Morris Rock, near its western end. The shoal is ¾ mile in length east and west and lies across the extremely intricate anchorage called the Goulet, so that small craft only can pass between it and Goulet Beach, from which it is distant ¾ mile to the northward.

A black can buoy is moored in a depth of 6 fathoms off the northeastern extremity of Goulet Beach Shoal. A black can buoy is moored on the northeastern end of Gabion Shoal and a black spar is moored northward of Morris Rock.

Clearing marks.—The chapel steeple at Bourgeois Inlet and the eastern point of Bisset Island in range, bearing 320°, leads eastward of the eastern end of Gabion Shoal, together with the shoal water off Goulet Beach; the northeastern end of Cascarette Island and the southwestern end of Ouetique Island in range, bearing 281°, leads just northward of its northeastern end; and Eagle and Bernard Islands touching, bearing 255°, leads clear along its northern side; but this mark must not be followed much westward of Morris Rock because of D'Escousse Shoal.

D'Escousse Shoal extends ½ mile eastward from Bernard Island and across to Gabion Point, so as to form the bar of D'Escousse Harbor. It is rocky, and there is a depth of 3 feet least water over it.

This shoal is separated from Gabion Shoal by a channel only ¼ mile wide. The channel, which carries 8 fathoms of water, leads toward Goulet Anchorage, which is accessible to small vessels only through narrow channels between the shoals.

A black spar buoy is moored on the northern end of D'Escousse Shoal.

The southern end of Poulamon Islet and the northern end of Bernard Island in range, bearing 248°, leads northward of D'Escousse Shoal.

D'Escousse Harbor is formed by Bernard Island, the several parts of which, united by beaches, extend for nearly 1 mile along the coast of Madame Island. The entrance from the eastward is by a very narrow channel, with 7 feet in it at low water, which passes close to the flagstaff, stores, and wharf at the northern part of Gabion Point. In 1912 dredging operations were commenced to straighten and deepen to 14 feet at low water this entrance channel across the bar.

The chapel, with its steeple, and the other buildings of the village on the coast southward of Bernard Island, mark this place, which is a secure and very pretty little harbor for the small vessels by which the fisheries are extensively prosecuted, and generally belong to Jersey merchants residing at Arichat. There is a pier 307 feet long, with 12 feet at low water at its outer end.

Poulamon Bay is a secure and capacious harbor, with three entrances formed by Eagle and Crow Islands, which lie nearly in a direct line from Bernard Island to Grande-digue, a distance of 2 miles to the westward. Poulamon Islet, small, low, round, and wooded, lies within Eagle Island, and, together with the shallows, divides the bay into two parts, of which the eastern division leading to Poulamon Creek, containing most of the houses, and affording the most roomy anchorage, in 4 or 5 fathoms, mud bottom, is the most frequented. The shoals extending in opposite directions from Bernard and Eagle Islands so overlap as almost to form a bar, over which there is a depth of 13 feet, with the northwestern end of Cascarette Island and Cordeau Point in range, bearing 16°. More water might be obtained with local knowledge. There is safe anchorage in 7 fathoms in the roadstead outside the bar.

Hawk Islet, united at low water to the northeastern end of Eagle Island, and ¾ mile westward from Bernard Island, forms the northwestern point of the eastern entrance to Poulamon Bay; it is bold to the northward, but to the eastward a shoal runs off 400 yards toward Bernard Island.

Poulamon Bay Light, fixed white, 34 feet above high water, visible 7 miles, is exhibited from a square white dwelling, 30 feet high, on the summit of Hawk Islet.

A fog signal answers vessels' signals.

Shoal.—In Lennox Passage, from Hawk Islet to Grande-digue, a distance of 1¼ miles, a shoal runs out ¼ mile east-northeastward from Crow Island; the northern point of Hawk Islet and the chapel steeple at D'Escousse in line, bearing 104°, leads northeastward of it. See also Birch Shoal above.

Tides and tidal currents.—It is high water, full and change, in the entrance to Poulamon Bay at 7h. 50m.; springs rise 6 feet, neaps 4½ feet. The tidal currents are weak in this bay, and the velocity seldom exceeds 1 knot in the channel off its mouth.

Directions.—If requiring shelter on the approach of bad weather, especially at the commencement of southeasterly winds, which seldom continue beyond a very few hours without bringing thick fog and rain, when off the eastern entrance of Lennox Passage, proceed as follows:

Pass Cap Rond at any distance between ½ mile and 1 mile, and steer 314° until the southwestern end of Ouetique Island and the northeastern end of Cascarette Island are in range, bearing 281°; keep this range until Poulamon Islet is just open northward of Bernard Island, and then steer with the last mark on until the steeple of the chapel at Bourgeois Islet is in range with the eastern point of Ouetique Island, bearing 21°, when anchor in about 9 fathoms, mud bottom. This position is 200 yards from the shallow water off the northern side of Bernard Island, and sheltered from southeasterly winds by D'Escousse and Gabion Shoals and by land in other directions.

To anchor off the eastern entrance of Poulamon Bay, when the steeple of the chapel at Bourgeois Inlet and the eastern point of Ouetique Island are in range, open the northern point of Crow Island a little northward of Hawk Islet, 261°. Keep this mark on until Poulamon Islet and Eagle Island close (and when they touch, bearing 235°, Cordeau Point is either in line, or only just shut in behind the western end of Cascarette Island, bearing 15°); then anchor in 7 fathoms, with the last mark on and the northern ends of Crow and Hawk Islands in range, or a little farther southward in 6 fathoms, with the two points on the northern side of Bernard Island in range, mud bottom.

If the draft is not over 13 feet water, to run into Poulamon Bay keep Cordeau Point and the western end of Cascarette Island in line, or very slightly open, bearing 15° astern, and when the southern side of Crow Island opens southward of Eagle Island the vessel is within the bar; then anchor in the harbor in 4½ fathoms, mud.

It is possible to take a vessel of large draft to the anchorage at Grande-digue, but the channel is narrow and difficult, and local knowledge is necessary.

Tides and tidal currents.—It is high water, full and change, at Grande-digue, in Lennox Passage, at 7h. 55m.; springs rise 6¼ feet, neaps 4½ feet. The tidal currents turn about three-quarters of an hour after high and low water on the shore, but they are often irregular. The flood sets westward and the ebb eastward. The currents are stronger around the spit at Grande-digue than in any other part of the passage, but their velocity even there seldom exceeds 2 knots.

The western entrance of Lennox Passage, between Rabbit and Janvrin Islands, is 1 mile wide, but the navigable breadth is reduced to ½ mile by Macdonald Shoal, a bed of rocks with 5 feet least water extending nearly ¾ mile along the northern coast of Janvrin Island, from which it is separated by a narrow and shallow channel. The western end of the shoal is ½ mile northward from Thomas Head.

A black spar buoy marks Macdonald Shoal.

Thomas Head in line with Janvrin Point leads just clear westward of Macdonald Shoal, but when in line observe that a small part of Wasting Islet is visible westward of Janvrin Point, and must not be mistaken for it. In standing toward the shoal, keep Janvrin Point in sight.

Cary Passage is situated eastward of Rabbit Island, and connects Lennox Passage with the basin of Inhabitants River. A gravel beach lies across the channel, but a channel available for boats has been cut through it.

Anchorage.—The anchorage in this entrance of Lennox Passage, anywhere northward of Macdonald Shoal, in 5 to 7 fathoms, is spacious and secure, but the best berth is off Cary Passage, in 7 fathoms, mud, where the main channel is 1 mile wide. Shallow water extends 200 yards off the southern coast of Rabbit Island and 400 yards off the eastern point of entrance of Cary Passage, where there is a rocky patch with 10 feet least water, 300 yards offshore.

Lights.—The lights shown from the following structures mark the principal turning points in Lennox Passage.

A square white tower and dwelling attached, with a red lantern, 32 feet high, on Glasgow Point.

A red lantern on a mast, 25 feet high, with a white shed at its base, on Dog Island.

A white square tower, 32 feet high, erected on Grande-digue Point, exhibits a fixed red light.

Buoys.—Black spar buoys are moored on the shoal off Glasgow Point, on the western end of a shoal northward of Martinique Cove, on the northwestern end of the shoal off Heron Point, on the northwestern end of the bank extending off Burnt Island, on the northern end of Middle Ground, and on the bank in mid-channel southward of

Moulin Point; and a black can buoy on the northeastern end of Grande-digue Spit.

Red spar buoys are moored on the southeastern side of Fish Shoal, on the eastern end of a shoal 1,500 yards 75° from Low Point, on the eastern edge of the shoal extending 200 yards 89° from Dog Island Light, and on the southern side of Ferry Reef.

General directions.—From the westward: Campbell Island lies 1½ miles eastward of the anchorage off Cary Passage, and the navigable breadth of Lennox Passage between the island and Fish Shoal, which lies ¼ mile off a small cove of Cape Breton Island, is reduced to 600 yards. Fish Shoal is rocky, with 10 feet least water on it; it is marked by a red buoy on its southeastern side.

From the fairway between Macdonald Shoal and Rabbit Island, steer eastward, and bring Burnt Island just open southward of Low Point, bearing 66°, and keep this mark on, which leads southward of Fish Shoal, and for about 1 mile farther eastward. The black buoy on the shoal off Glasgow Point is left to the southward. When Thorn Island is almost shut in by Glasgow Point, bearing 184°, steer 80° until the northern end of Burnt Island and the southern end of Dog Island are in range bearing 62°, which mark leads southward of the shoal off Rock Point, between the shoals, the eastern end of the northern of which is marked by a red buoy, and the western end of the southern by a black buoy, and northward of the black buoy on Heron Point Shoal, to Burnt Point, where the channel turns northeastward, between that point and Burnt Islands, and where the deep water is only 100 yards wide. Pass midway through this narrow opening, leaving the black buoy on Burnt Island Shoal on the starboard hand, and round Burnt Islands to the eastward, steering between them and Dog Island, until the eastern point of Burnt Islands is in range with Heron Point, about 232°; keep this mark on astern, which leads between Middle Ground and Dog Island, where the channel is only 100 yards wide.

Middle Ground is rocky, with 4 feet least water, and when the channel between it and Dog Island is fairly entered, steer 46°, or so as to leave the black buoy on the northern end of Middle Ground on the starboard hand, and keep Heron Point only just shut in behind the eastern point of Burnt Islands, until Grande-digue Point (the land, not the shingle spit) and the southern end of Hawk Islet are in range bearing 87°. This mark leads to the excellent anchorage off the ferry at Grande-digue, where there is room for large ships in 5 to 8 fathoms, mud bottom. A long spit of shingle runs out from Grande-digue Point to the northward nearly 400 yards across the channel, and shelter the anchorage completely from the eastward. A great part of the spit is covered at high water, but can generally be discerned by the rippling of the tide. At Grande-digue there are extensive gypsum quarries, several tolerable farms, and the ferry by which the mail to Arichat crosses the passage.

Ferry Reef, which lies to the westward of the spit, is nearly dry at low water, and extends halfway across the passage, being separated from the northern shore by a channel so narrow as to be only navigable by small craft. The southern edge of this reef is marked by a red buoy, and the northern extremity of Grande-digue Spit is marked by a black buoy; to clear the reef, keep Ouetique Island open of Birch Island, and to clear the spit keep the northern end of Ouetique Island shut in behind Birch Point.

The ship channel, after passing southward of Ferry Reef, where it is 400 yards wide and clear, turns northeastward between it and Grande-digue Spit, and then round the latter to the eastward and southward; its navigation here, being narrow and crooked, is difficult.

To beat through the channel an intimate local knowledge and acquaintance with the set of the tidal currents is indispensable. To run through the narrows at Grande-digue eastward, with a fair wind, proceed as follows: Approach Grande-digue with Grande-digue Point and the southern end of Hawk Islet in range until the southern end of Cascarette Island opens a very little southward of Birch Island, bearing 68°, which mark leads well clear of Ferry Reef, and when Tickle Channel, to the westward of Birch Island, opens and bears northward of 21°, steer toward it, until the southern end of Ouetique Island is over the beach of Birch Point, bearing 73°. Keep this mark on past Grande-digue Spit, or until the western end of Birch Island bears 336°; then alter course to 134° or toward the middle of the western entrance of Poulamon Bay, and continue on that line until the northern ends of Crow and Eagle Islands are in line; then steer east toward the northern end of Ouetique Island until the chapel steeple at D'Escousse is in range with the northeastern point of Hawk Islet, and then 86° so as to pass Hawk Islet at the distance of 300 yards. This track leaves Birch Shoal, which is marked by a red and black buoy, to the northward.

Inhabitants Bay, situated northwestward of the western entrance of Lennox Passage, and northeastward of the southern entrance of the gut, is about 2½ miles wide at the entrance between Bear and Turbalton Heads. It contains the following anchorages:

Turbalton Bay, northward of Turbalton Head, and between it and Evans Island, is a small but secure anchorage. In approaching it, avoid the reef which runs out 550 yards westward of Turbalton Head, and partly dries at low water. Janvrin and Peninsula Points in line, bearing 142°, or the two extreme points on the western side of Evans Island in line, bearing 358°, leads just clear westward of this reef, in 4½ fathoms. Shallow water extends from the shores on either side, and from the small islets in the bottom of the bay. Do not enter the bay farther than to bring Turbalton Head and Cape Argos in line, where at about 600 yards from Turbalton Head the depth is 4½ fathoms at low water. With the cape a little open westward of the head the depth is 5 fathoms; in either case the bottom is mud, and the reef breaks the swell from the southward.

Seacoal Bay, on the western shore, and 1½ miles northward of Bear Head, is well marked by the high cliffs of Carleton Head, its northeastern point. It affords anchorage in 5 to 3 fathoms, mud, over a space, about 1,200 yards northeast and southwest, and a similar distance northwest and southeast, secure in all excepting southeasterly to southerly winds, which is very convenient for vessels bound in through the gut, and detained by strong northwesterly winds.

Port Malcolm is situated on the north side of Seacoal Bay.

Inhabitants Harbor, within Evans and Freeman Islands in the northeastern part of Inhabitants Bay, is not much frequented, being out of the line of general navigation, but it has space and depth of water sufficient for a large number of vessels, and is quite secure at all seasons. The southern side of this harbor is formed by islands inclosing the basin, where vessels might securely winter. The channel leading into the harbor, between Long Ledge and Evans Island, is not less than 300 yards wide from 3 fathoms to 3 fathoms on either side, and carries 7 to 12 fathoms water, mud bottom, but the deep-water channel becomes very narrow northward of Bumbo Islet.

Inhabitants River flows southward into the harbor, and its narrow and winding channel is navigable for small vessels for about 4 to 5 miles, while boats can ascend to the bridge, a distance of 7 miles. There are some good farms on the banks of this river, but the shores of the harbor are very thinly settled and present a barren appearance.

Long Ledge is marked on its southern edge by two black spar buoys, one at the western end and the other eastward of the ledge.

Directions.—Approaching from the southwestward through Inhabitants Bay, steer to pass the western end of Evans Island at a distance of 400 yards, not decreasing the depth to less than 6 fathoms, and remembering that the banks on either side are very steep for vessels drawing more than 10 feet. Follow the coast of the island round northeastward, approaching it at the same time very gradually, so as to pass Steep Head, its northern end, at the distance of 200 to 300 yards. There is safe anchorage when past Steep Head, but to go farther in run in mid-channel toward Bumbo Islet, which is small, round, with low clay cliffs, and bears 60°, distant nearly 1 mile from 200 to 300 yards northward of Steep Head.

The channel between Round and Freeman Islands, leading into the Basin, is about ½ mile eastward of Steep Head; when 700 yards from

Bumbo Islet, the main channel between the islet and Indian Point, leading into the harbor to the northward and eastward, opens, as well as the entrance of Inhabitants River, which lies ¾ mile to the northward. Shallow water extends 200 yards off Bumbo Islet, and the main channel passes northwestward of it and turns eastward into the harbor. When about 600 yards from Bumbo Islet follow the channel, using the plan as the guide. Good anchorage can be obtained everywhere in the channel, and if less water is desired the bight southward of Bumbo Islet, and between it and Freeman Island, affords a good berth in a moderate depth.

Tides and tidal currents.—It is high water, full and change, in Inhabitants Harbor, at 8h. 20m.; springs rise 6½ feet, neaps 4¾ feet. The tidal currents in the harbor are weak, and the velocity in the entrance, where it is greatest, seldom exceeds 1 knot.

GUT OF CANSO.

The Gut of Canso, separating the mainland of Nova Scotia from Cape Breton Island, and forming the southwestern entrance of the Gulf of St. Lawrence, is of great and increasing importance in navigation. The number of vessels annually passing through it amounts to several thousands, and not only do the numerous fishermen, coal traders, and coasting vessels, to and from the ports of Newfoundland, Nova Scotia, New Brunswick, and the United States, use this passage, but also many vessels trading between Great Britain and the southern parts of the Gulf of St. Lawrence. It is by far the best route for sailing vessels to and from the southern parts of the gulf, especially when homeward bound in the fall of the year, as it affords safe anchorage until an opportunity offers for sailing with the first of a northerly or westerly wind, so as to secure a safe offing before the occurrence of the thick weather which almost always accompanies winds from the contrary quarter.

The length of the passage through the Gut, from the lighthouse on Eddy Point at the southern entrance to the lighthouse at the northern entrance, is 14½ miles, and its least breadth, between Balache Point and Cape Porcupine, is 900 yards. The depth of water in the channel is less than 15 fathoms in a few places only, and in the deepest part, off Cape Porcupine, it reaches 31 fathoms. This great depth, the rapidity of the tidal currents, and the rock or gravel bottom, render anchorage unsafe, excepting at the places indicated herein.

Excepting for a short distance northward of Port Hawkesbury, and at Ghost Beach, the character of the land on either side is high, rising more or less abruptly to the summits of ridges of considerable elevation. Cape Porcupine, a precipitous headland on the western shore, 640 feet high, is the most remarkable feature, and the scenery in its vicinity is of great beauty. The shores on both sides of the Gut are generally bold, but there are several small rocks and shoals at no great distance off the land. The settlements on either side are increasing, especially at the several anchoring places, where supplies may be obtained.

The rocks, forming the land on both sides, belong to the lower members of the coal formation, and are slates, conglomerates, sandstones, sometimes containing fossils, gypsum, and gypsiferous marls, with occasionally carboniferous limestone. This last, containing fossils, is well displayed at Port Hastings, where there are also large beds of white gypsum, which at once point out that anchorage.

Caution.—Vessels should approach either shore of the Gut with caution, as the soundings are sparse.

Ice.—Owing to ice, navigation is suspended from about the beginning of January to the end of April.

Eddy Point, the southern entrance point of the Gut, is sand and gravel, inclosing a small pond.

Eddy Point Light, fixed white, 55 feet above high water, visible 12 miles, is exhibited from a red lantern on a square structure with dwelling, 44 feet high, painted white with a black diamond on the seaward side, on Eddy Point.

A fog signal answers vessels' signals.

Eddy Spit, of sand and stones, extends ¼ mile northeastward from high water mark on Eddy Point; it is almost always shown by the rippling of the tidal current.

A black can buoy is moored in 9 fathoms close eastward of the spit.

Ship Point and Bear Island in line, bearing 301°, lead about 200 yards northeastward of the shoal.

Martin Shoal extends nearly 350 yards off the southern shore of the gut, at 2 miles westward from Eddy Point, and is of rock.

Melford and Critchet Points in line, bearing 299°, lead just outside its edge, in 4 fathoms.

Bear Head lies 2¼ miles 313° from Eddy Point, and it is the northeastern entrance point of the gut. Shoal water extends nearly 400 yards southeastward of it.

Bear Island, situated ¼ mile westward of the head, is connected to the shore northeastward of it by a shingle spit.

Bear Island Light, fixed red, is shown, 42 feet above high water, from a square white wooden structure with a red roof, 35 feet high, in the center of Bear Island.

A fog signal answers vessels' signals.

Bear Reef extends nearly 300 yards southward from Bear Island and has 6 to 9 feet at low water over large rocks.

Caution is necessary in approaching these shoals, for the water is deep near them, and there are no good clearing marks.

Anchorage.—At Critchet Cove, on the southwestern shore of the gut, and about 1½ miles westward from Bear Head, there is a shallow bank of mud and sand, on which small vessels frequently anchor, but of which vessels of large draft should beware. Its outer edge, in 5 fathoms, is nearly ¼ mile offshore.

Ship Rock, with 6 feet least water over it, is 140 yards off the eastern shore of the gut, at 2.1 miles from Bear Island, and ¼ mile northwestward of Ship Point. It is marked by a red spherical buoy.

Ship Point and Bear Head in line, bearing 119°, lead 40 yards outside the rock, and therefore, in standing toward it, tack before the head and point are in line.

Anchorages.—There are indifferent anchorages, either open to certain winds or with loose holding ground, in Eddy, Critchet, and Byers Coves; eastward of Bear Head; northwestward of Bear Island; off Doolan Pond and Madden Cove; and in Pirate or Holland Cove; where vessels frequently wait for wind or tide in fine summer weather, and to which the plan is the guide.

Cahil Rock, which dries at low water, lies 120 yards off the western shore of the gut, 2½ miles northwestward of Critchet Point, and ¾ mile southeastward of Holland Cove.

Roger Point in line with the northeastern side of Pirate Island (which is seen over the low shingle rock of Pirate Point), bearing 300°, leads 120 yards outside the rock.

Madden Point is 2¼ miles northwestward of Ship Point on the eastern side of the gut. The western terminus of the Cape Breton Railway to St. Peter is situated on the point, but a branch connects with the Intercolonial at Port Hawkesbury.

Wharf.—A railway wharf has been built out westward, 200 feet, into the gut, 200 yards southward of Madden Point, and it is reported that vessels drawing 20 feet can go alongside its outer end.

Tupper Point, about 1,400 yards northwestward of Madden Point, is the southern entrance point of Port Hawkesbury.

Tupper Point Light, fixed red, 54 feet above high water, visible 8 miles, is exhibited from a square white tower with a dwelling attached, situated 147 feet within Tupper Point.

Storm signals are exhibited at Tupper Point.

Shoal.—A rocky shoal, with less than 16 feet of water, extends 300 yards westward from the shore just southward of Tupper Point. The edge of the shoal is steep, and the depth off it increases almost immediately to 5 fathoms.

Railway ferry.—The Cape Breton branch of the Intercolonial railway has its western terminus at Tupper Point, where a large group of wharves has been built immediately southward of the lighthouse, the wharves extending about 400 feet into the gut and covering a frontage of about 500 feet. The railway station and sheds are on these wharves, which form a conspicuous mark.

From Tupper Point the ferry crosses to the terminus of the mainland branch at Murray Cove. The Scotia, the railway ferry ice-breaking steamer, either end of which acts as bow, is constructed to carry 9 railway sleeping cars, each 80 feet long, and weighing 52 tons unloaded, on three sets of rails on deck.

The railway ferry is open throughout the year.

Hospital.—A marine hospital is maintained at Tupper Point.

Port Hawkesbury is a large cove, terminated by a bridge nearly 1 mile from its entrance. There is a settlement with two chapels on the northeastern side of the harbor, and there are stations of the Intercolonial and the Inverness and Richmond Railroads.

Vessels winter at the wharves in safety. The population of the settlement was 684 in 1911.

Premier Shoal, with 13 feet least water, soft mud, is a middle ground in the entrance of the port. It may be passed on either side, but the wider and deeper channel is northward of it.

Tupper Point and the western end of Pirate Island in line, bearing 190°, leads westward of the shoal in 5 fathoms.

Anchorage.—The roadstead off the mouth of this harbor, and outside Premier Shoal, is much frequented by vessels detained by southeasterly winds. The depth in the roadstead is 7 to 9 fathoms, sand, gravel, and mud, with Pirate Island open westward of Tupper Point.

The anchorage is open to north-northwesterly winds, which blow directly through the gut, and cause, at times, a heavy sea, with very rough riding, excepting when well in toward the head of the harbor, where anchorage in 3½ fathoms, mud, is quite secure and out of the tidal currents.

Prohibited anchorage.—Anchorage is prohibited between Tupper Point and Murray Cove in the track of the railway ferry.

Ice.—The port is usually frozen over about February 3, and clear of ice about April 23, being completely closed only at intervals between those dates. Field ice comes in and disappears about the same dates as the harbor ice. The first vessel arrives about April 5, and the last one leaves about December 22.

Directions.—Vessels of less than 12 feet draft enter Port Hawkesbury, passing over Premier Shoal at all times, but if of larger draft the channel northward of that shoal, with 4½ fathoms of water at low water should be taken, thus:

Enter north of Premier Shoal until Tupper Point bears 225°, when the vessel is within Premier Shoal, and may steer to the southward into the middle of the harbor. The channel southward of the shoal, with 3½ fathoms at low water, is neither so deep nor so wide, but it is more convenient for sailing vessels with southerly winds; the plan is a sufficient guide.

Quarantine.—Port Hawkesbury is a minor quarantine station.

Communication.—Besides communication by railway and telegraph, steam vessels run between Port Hawkesbury and Pictou twice a week.

Pirate or Holland Cove.—Pirate Island, small, rocky, and united to the mainland by a beach of shingle, forms the eastern point of Pirate Cove, and all within it and a line drawn across to the wharves on the western side is dry at low water, excepting a narrow boat channel carrying 3 feet of water, which leads to the bridge across the cove at the head of the port and about ¼ mile from its entrance.

The anchorage in this cove, although deep enough, is inconveniently small for large ships, but safe and good for small vessels. The best berth for anything larger than a fishing schooner is in 7 to 8 fathoms, mud bottom, with Pirate Island bearing 122°, distant about 200 yards.

Port Mulgrave is on the western shore of the gut, opposite Point Tupper.

Murray Cove is the southern cove of Port Mulgrave.

Vessels passing are reported by telegraph.

Venus Cove, the northern cove of Port Mulgrave, is an excellent anchorage, especially in northwesterly winds. The best berth is in 6 to 7 fathoms, mud, directly off the mouth of the cove, with Macnair Point in line with Port Hastings bearing 347° and the point distant about 400 yards.

Railways—Wharves.—Port Mulgrave is connected with the railway system of Canada by the Intercolonial Railway. Wharves, together with a railway station, have been built on the southern side of Murray Cove. The railway ferry crosses to these wharves.

Venus Cove is a good watering place, and there are wharves for landing at all times of tide. The settlement contains a small Anglican Church.

Coal can be delivered to vessels at the wharves at Ports Hawkesbury and Mulgrave, but there are no special facilities for such service.

Port Hastings (Plaister Cove), on the eastern shore, and 2.4 miles northwestward of Port Hawkesbury, is the first safe anchorage after entering the gut from the northward. There are conspicuous cliffs of white gypsum, 120 feet high, on its northwestern side, and a short distance within the bridge near its entrance. The head of the port, which forms a cove, is dry at low water.

The town contains a post office, a large and noticeable telegraph office, whence electric cables cross the gut to the mainland, and a station of the Inverness and Richmond Railway. There is a conspicuous church just northwestward of the port.

Notice boards, warning vessels not to anchor near the line of the cables, are erected on Balache Point and Cape Porcupine.

Dixon Rock, with 12 feet of water over it, lies 140 yards 156° from Mackeen Point, and 240 yards 236° from the western point of Port Hastings.

Anchorage.—The anchorage at Port Hastings is convenient and safe in all winds. In northerly gales the swell, deflected by Cape Porcupine, causes rather uneasy riding, but it does not endanger vessels well anchored in a clear berth.

Piers.—The Inverness & Richmond Railway Co. has constructed a coal-shipping pier for steamers, 330 feet long, with 20 to 28 feet of water alongside, with the railway running on it, at the port, and there is an inner pier for schooners.

Directions.—To avoid Dixon Rock keep the cove open so that the whole of the bridge as well as the white cliffs above it are visible. In anchoring a large vessel keep Balache Point well open, and do not go into less than 7 fathoms water, but small vessels anchor in 4 to 5 fathoms, mud. The bottom becomes sandy out toward the steep edge of the bank, in 10 fathoms, after which it is rocky in the deep water and strength of the tidal currents.

The tidal eddies render it advisable to moor, especially in large vessels making any stay, in which case one anchor should be placed well to the southward, in 9 to 10 fathoms water.

Tides and tidal currents.—It is high water, full and change, in Port Hastings, at 9h. 10m.; ordinary springs rise 4½ feet, neaps 3 feet; extraordinary tides sometimes rise 6 to 7 feet, and at other times only 2 feet.

The tidal currents at this anchorage are eddies, often running irregularly, but generally in a contrary direction to the main stream in the channel, and with a velocity seldom exceeding 1 knot.

Coal can be obtained at Port Hastings; 600 tons can be sent down daily, and 200 tons per hour loaded by chutes.

Water.—Good water can be supplied by water boat. There is an excellent watering place on the western shore of the gut in the bay between Keaton Point and Cape Porcupine.

Balache Point is on the eastern side of the gut, ½ mile westward of Mackeen Point; Balache Rock, which nearly dries at low tide, lies in the bay between these points 200 yards eastward of Balache Point and 100 yards offshore.

Balache Point Light, fixed white, 44 feet above high water, visible 12 miles, is exhibited from a white square wooden tower.

A fog signal answers vessels' signals.

Madagascar Rock, dry at low water, lies not quite 100 yards off the western shore under the highest part of Cape Porcupine. The rippling of the tidal current over this rock can generally be seen;

nevertheless, its situation, off a projecting point in the narrowest part of the passage, nearly in the full strength of the current, and at a place where sudden flaws of wind from various directions are frequent, renders caution necessary in its vicinity, and the rock should be given a wide berth.

Mill Creek is on the western shore, with Balache Point bearing 83°. Vessels occasionally anchor off the creek in fine weather, but the anchorage is open to northerly winds, which often commence suddenly and send in a heavy sea, and irregular eddies render it difficult to keep a clear anchor.

The shores.—The eastern shore of the gut from Balache Point trends about 4 miles 333° to Heffernan Point, and the western shore from Mill Creek about 4½ miles 323° to North Canso Lighthouse.

North Canso Light, flashing white, 110 feet above high water, visible 16 miles from a square white building, is exhibited at 120 yards within high water mark at the western side of the northern entrance of the gut and about 4 miles northwestward of Balache Point.

Anchorage.—Under the lighthouse, and within ½ mile eastward of it, there is tolerable anchorage in all but northerly winds.

Gut of Canso—Directions.—There is little difficulty in navigating the Gut of Canso, either with a leading or a head wind. When beating northward into the gulf the aim should be to gain the anchorage at Port Hastings, and to start thence with the turn of the tidal current so as to secure a good offing in George Bay before the ebb makes.

The approach from the northward, through George Bay, is unattended with difficulty or danger, excepting in fogs or snowstorms. The soundings are then the only guides, and they are sufficient in all ordinary cases; if possible, strike soundings on the bank off Long Point, and then follow its edge along the coast of Cape Breton Island, in the low-water depth of 10 fathoms, to the entrance of the gut. The North Canso Whistle Buoy, black and white vertical stripes, lies in the middle of the approach, 3 miles outside the entrance. It is seldom so thick, especially in a breeze of wind, but that some part of the shore is seen before the vessel has run far after entering so narrow a strait. With a head wind, tack off and on the same shore until soundings are struck (in the reach to the westward, and after crossing the deep water) on the edge of the bank off Cape Jack, where, if at night and the fog so thick that the light is obscured, it is advisable to anchor and wait for a change. The ground there is not good, but it is out of the strength of the tidal currents, and an anchor will hold in moderate weather. The anchorage ½ mile eastward of the lighthouse, and on the same side of the channel, should be preferred if attainable; there are some spots of mud there, in which an anchor holds well in 7 to 9 fathoms, and where the strength of the stream is not great.

Vessels proceeding southward through the gut very frequently meet a southerly or southeasterly wind, usually accompanied with fog and rain; in this case the roadstead off Port Hawkesbury is a roomy and convenient anchorage. Eddy Cove, from its more advanced position at the entrance of the gut, offers to vessels sailing with the first of a fair wind, a better chance of clearing Chedabucto Bay and the Canso Ledges before dark; but it is only recommended in fine, settled, summer weather, for the ground is not good and the anchorage is open to northerly winds. Turbalton Bay is much more secure, but it is rather small for a large and weakly manned vessel to weigh from should a strong wind set in suddenly from the westward.

Tides and tidal currents.—It is high water, full and change, at Bear Head, at 8h. 30m.; springs rise 4½ feet, neaps, 3 feet; at the north entrance of the gut high water interval is 9h. 26m.; mean range, 2.4 feet; spring range, 3.1 feet; in both places extraordinary tides may rise 6 to 7 feet, or only 2 feet.

The rise and fall of the tides along the shore usually continue through nearly equal periods of time, but the turn of the tidal currents (the flood setting northward and the ebb southward) varies from 1 to 4 hours after high and low water along the shore.

The velocity of the current off Cape Porcupine, where it is greatest, is ordinarily about 4 knots, but occasionally it reaches 5 knots. At most of the anchorages in the gut, and under almost every point, there are eddies usually running in the opposite direction to the main stream outside, but at a much less velocity, and great attention is necessary to ensure a clear anchor.

"The apparent irregularities in the Gut of Canso are due to the difference in the character of the tide itself at the north and south ends of the gut. The tide in the region of Northumberland Strait shows a marked diurnal inequality, which accords with the declination of the moon, and while this change recurs in the period of the tropical or declination month at the northern end of the gut, the tide at the Atlantic end maintains the usual variation in height from springs to neaps in the period of the moon's phases. As the leading variations in range are thus quite out of accord and the current through the gut depends on the difference in the level of the tide at the two ends, it necessarily shows great complexity under such conditions.

"Before this explanation was found by the investigation of the characteristics of the tide it was supposed that the currents were chiefly governed by the wind. The winds may have a disturbing effect, especially as the range of the tide is not great, but the main variations are undoubtedly astronomical, with the moon's declination as probably the leading factor."

GEORGE BAY.

George Bay extends 18 miles northward from the Gut of Canso, and its northern entrance, between Cape Linzee and Cape George, is 17½ miles across. Its navigation is important, as it is traversed by the numerous vessels which pass in or out of the gulf by the gut.

Cape Breton Island—West coast.—Crossing the northern entrance of the Gut of Canso, from North Canso Lighthouse to Cape Breton Island at Heffernan Point, a distance of 1.4 miles, for 7 miles northward along the western coast of the island there are no detached dangers, nor does shallow water anywhere extend ½ mile from the shore. The land is high and rather barren looking, rising about ½ mile inland to the summit of a ridge 850 feet above the sea, which continues parallel to the coast for 6 miles to Long Point. The only remarkable object in this distance is the church at Craignish, which bears 27°, distant 2¾ miles from the lighthouse. A wharf, 220 feet long, extending to 6 feet at low water, has been constructed at Craignish. From Long Point a low cliff of red sandstone, northward to Emersion Point, a distance of 7.3 miles, shoals extend a considerable distance off the coast.

Gut of Canso approach—Whistle buoy.—A conical buoy, painted in black and white vertical stripes, and surmounted by a whistle which is sounded by the motion of the buoy, is moored in 23 fathoms, at a distance of 3 miles, 333°, from North Canso Lighthouse.

Judique Shoal is of rock, and about 1,600 yards in length west and east, if the very shallow part is only reckoned, but patches with 2 to 3 fathoms and much rocky ground lie both northward and southward of it.

The least water, 4 feet, is close to the western point of the shoal, and when on it the western extremity of the high land of Cape Porcupine is in line with Flat and Heffernan Points, which form the western end of Cape Breton Island.

There is a narrow channel with 3½ fathoms water between the shoal and the land, but only small craft should attempt the passage.

A red buoy is moored at the western end of Judique Shoal.

The whole of the high land of Cape Porcupine opens westward of Heffernan Point, 154° true, leads westward of Judique Shoal, in 6 fathoms; or the church at Port Hood opens westward of Cape Susan, 1°, leads westward of the shoal in 4 fathoms.

Judique Bank, 2.6 miles 322° from the northwestern end of Judique Shoal, is a small rocky patch with 4½ fathoms least water and much foul ground around it. It must be avoided by vessels of moderate draft when the sea is heavy.

Cape Linzee shut in by the eastern parts of Port Hood Island, or the whole of the high land of Cape Porcupine open westward of Heffernan Point, 154°, leads westward of Judique Bank.

Judique village, 4.8 miles northward of Long Point, contains a church. Mackay Point lies about 1.6 miles, 322°, from the church, and a breakwater, 725 feet long, extends from the point into a depth of 6 feet at low water, for the protection of fishing boats. There is a telegraph office at Judique.

Ponds.—Judique Pond, close northward of Judique Church, is barred by a sandy ridge, so as only to admit boats at high water; shallow water extends 1¼ miles off it. Catherine Pond, 3 miles, and Susan Creek, 5 miles, northward of Judique Church, are similar places; the latter admits boats at high water, and is situated northward of Cape Susan, which the white gypsum in its cliffs renders noticeable.

Port Hood, the only anchorage at all sheltered on the west coast of Cape Breton Island northward of the Gut of Canso, was formerly a fairly secure harbor, Port Hood Island being then a peninsula, united to the mainland by a range of sandhills, which has been entirely swept away, and the sand widely spread over the northern part of the harbor. The first breach in this sandbar was formed by the sea about the year 1827, during a heavy northerly gale; it was at first a very narrow channel, and being neglected, the tidal currents enlarged it with increasing rapidity, and the harbor is now unsafe during northerly gales, except in the small bay on the eastern side of Port Hood Island. The intricate northern entrance, with 12 feet in it at low water, is used by fishing schooners drawing 12 feet, except in strong northerly winds, when the sea breaks heavily.

Spithead, a sandy flat, nearly dry at low water, steep-to, and usually visible, extending 1,200 yards northeastward from Portsmouth Point, the southern end of Port Hood Island, affords partial shelter from southerly winds, but a strong southerly or southwesterly gale of any duration sends in a heavy swell.

A black buoy is moored in 3 fathoms on the edge of the shoal water, with Portsmouth Point bearing 316°, 400 yards.

A black buoy is moored at the eastern side of Spithead Shoal.

The southeastern end of the trees northeastward of the village in line with the Roman Catholic Church, bearing 20°, leads southeastward; and the eastern end of H. Smith's house in line with the western end of the chapel, bearing 336°, leads eastward of Spithead Flat.

Rocky shoal.—Off the mainland, but outside the entrance of the port, a rocky shoal, with 12 to 18 feet of water, and steep-to, runs out 700 yards ½ mile northward of Ragged Point.

Cape Susan and Kate Point in line, 169°, leads just outside this shoal, but this mark may not be easily made out.

Port Hood Light, occulting white, 55 feet above high water, visible 10 miles, is exhibited from a square white tower, with a red lantern, and a dwelling attached, on the cliff abreast Spithead, at the southeastern side of the southern entrance to Port Hood.

Dean Shoal, a steep sandy flat on the mainland side of the port, extends 600 yards from the sandy beach at Mill Creek.

A red buoy is moored in 3 fathoms on the western edge of Dean Shoal.

Cape Linzee and Isthmus Point in line, bearing about 351°, leads nearly 200 yards westward of Dean Shoal, together with the shallow water, as far out as opposite Porthsmouth Point, but not farther southward.

Port Hood Island is 2 miles long north and south and 210 feet high; there are flourishing farms on the inner side of the island. Smith's house and barn are on the shores of the bay on that side of the island, and those of the younger Smith, together with his fish shed and wharf, farther northeastward and ¼ mile within Smith Point, the eastern point of the island. With the exception of the sandy beach in the above bay, the island is surrounded by cliffs of various heights up to 123 feet, formed of soft reddish sandstone, shales, and marls, and containing occasionally thin seams of coal, with beds of gypsum, limestone, and trap, which last show well at the northwestern end of the island.

Shoal.—A spit with 3 to 6 feet of water over it extends 900 yards southward from Smith Point.

A red buoy marks the southwestern and a similar buoy the southeastern end of the spit.

Henry Island, or Justaucorps, lies about 1 mile southwestward of Port Hood Island. It is about 1 mile long and its greatest height is 195 feet. It is of the same rock formation and also nearly surrounded with cliffs, which yield rapidly to the action of the waves and of the atmosphere, and which on the outer side are 100 feet high. It has no permanent inhabitants, but is much frequented by fishermen during the fishing seasons.

The island is bold to seaward, but shallow water runs out from Fishery Point, its southeastern point, 700 yards to the depth of 3 fathoms and ¾ mile to 5 fathoms.

The passage between Henry and Port Hood islands has numerous rocky shoals in it, and is so intricate that it should not be attempted unless in a very small vessel, with fine weather, and local knowledge.

Henry Island Light, group flashing white, 240 feet above high water, visible 22 miles, is exhibited from an octagonal tower, its sides painted red and white alternately, and the lantern red, on the summit of Henry Island.

The keeper's dwelling, a white building, is situated 165 feet southward of the lighthouse.

Ice.—The harbor is usually frozen over about January 20, and is completely closed until about April 20, when the ice clears. Field ice comes in and disappears about the same time as the harbor ice.

The first vessel arrives about May 1 and the last leaves about January 1.

Directions.—Pass not less than ¼ mile southward of Henry Island, steering 77° until the southeastern end of the trees northeastward of the village is in line with the Roman Catholic church, bearing 20°, which leads southeastward of Portsmouth and Spithead shoals; and when the eastern end of H. Smith's house is in line with the western end of the chapel on Port Hood Island, bearing 336°, keep this mark on till Port Hood Lighthouse bears 122°, when steer about 302° for the distance of 400 yards and anchor in about 22 feet of water.

Caution.—Implicit reliance must not be placed in the buoys, as they are frequently out of position.

Anchorage.—At the anchorage in the northwestern part of Port Hood, formed by the eastern side of Port Hood Island, there are depths of 3 to 4½ fathoms, mud, and the heavy swell does not roll in round the northeastern point of the island, owing to the spit extending southward from Smith Point.

Tides and tidal currents.—High water interval at Port Hood is 8h. 53m.; mean range, 2.7 feet; spring range, 3.5 feet. The flood current sets southward and the ebb current northward. These currents are weak at the anchorage, and their velocity in the harbor is usually less than 1 knot.

Port Hood Village is well situated on the mainland, opposite the northern part of Port Hood Island. The steeple of the Roman Catholic Church, a red brick building, and the stone courthouse are conspicuous. There is a telegraph office at Port Hood. The population in 1911 was 1,078.

Supplies of fresh provisions can be obtained, but there is no good watering place.

A pier with a depth of 12 to 15 feet at its outer end extends off the village on the eastern side of the harbor. The Port Hood Coal Co. have loading piers here.

Storm signals are exhibited at Port Hood.

Southern and western shores of George Bay—Light.—North Canso Lighthouse is at the northern entrance of the gut.

Havre Bouche is a small but convenient harbor for schooners lying 1.3 miles westward of North Canso Lighthouse and between that lighthouse and Cape Jack. It has a depth of 4 feet at low water in its narrow entrance between stony points, and 13 to 14 feet within. There is a small stream at its head. The shores and neighborhood are well cultivated, and there is a church near the shore about 1 mile westward of the entrance or halfway toward Cape Jack.

Havre Bouche Range Lights.—Fixed white, 36 feet above high water, visible 9 miles, is exhibited from a square white tower on the southwestern shore of Havre Bouche Harbor.

A fixed red light, 107 feet above high water, visible 9 miles, is exhibited from a similar tower, 473 yards, 193°, from the above light. These lights in line lead through the dredged channel over the bar.

Tides.—It is high water, full and change, at Havre Bouche at about 9h. 30m.; springs rise 4 feet, neaps 2 feet, but the rise may be increased by northerly winds.

Cape Jack, a cliff of red sandstone, 45 feet high, nearly 2 miles westward from the western entrance point of Havre Bouche, is a prominent headland.

Jack Shoal extends from the cape northward 1 mile to 3 fathoms water, and 1½ miles to 5 fathoms. Between ½ and ¾ mile offshore there are two large patches of rock, which dry at half tide, leaving a passage, carrying 12 feet water, between them and the cape.

Jack Shoal is dangerous in thick weather, when it should be approached with great caution, especially from the eastward, as the soundings on that side are irregular and deep near the shoal, although sufficient to insure safety if the lead be kept going. The shoal should not be approached within the low water depth of 10 fathoms.

North Canso Light is obscured by forest over Jack Shoal, or when bearing eastward of 120°; by keeping the light open, Jack Shoal is given a berth of over 1 mile.

A red conical buoy, with "Jack Shoal" on it in white letters, is moored in 6½ fathoms, at about 10° true, 1 mile from Jack Shoal.

Breakwaters.—Breens Pond Breakwater extends westward ½ mile southward of Cape Jack, and Blue Rock Breakwater extends southward from the western extremity of Cape Blue.

Little Tracadie Harbor, with only 1 foot at low water over its bar, lies 2¾ miles southwestward of Cape Jack. Its entrance is in the bay between Cape Blue, which is limestone, and shelters the entrance from northeasterly winds, and Barrio Head, a cliff of red sandstone, 110 feet high.

Tracadie Harbor, 1½ miles westward of Little Tracadie Harbor, is separated from the bay by a series of islands and connecting beaches of sand and gravel, and its entrance was formerly westward of Delory Island by a narrow and crooked channel, with a depth of 2 feet in it at low water, but in 1863 a passage was dredged on the eastern side of the harbor through a beach which connected the mainland with Delory Island. The channel carries a minimum depth of 6 feet at low water springs, except over the bar, where it varies from 3 feet after storms to 5 feet. There is protection work on the eastern side of the channel.

The harbor is extensive and has 14 feet water in some parts within, with many coves, islets, and small streams. Tracadie River, the principal of these streams, is at the head of the eastern arm, 2½ miles in from the sea.

Tides.—It is high water, full and change, at Little Tracadie and Tracadie Harbors at about 9h. 30m.; springs rise 4 feet, neaps 2¼ feet, but the rise may be increased by northerly winds.

Tracadie village and church are about 1 mile within the entrance. The church is large and can be seen from a distance seaward. There is a station of the Intercolonial Railway at Tracadie. The village had 440 inhabitants in 1891. The inhabitants of these small harbors, including Pomquet, are Acadians of French extraction, who live principally by agriculture, fishing only to a limited extent during the herring and mackerel seasons.

Bowman Bank.—Bowman Head lies 1¼ miles westward of Middle Head, the northern point of Delory Island, and Quarry Point is 1½ miles farther westward. Bowman Bank runs off 2¼ miles to the northwestward from between Bowman Head and Quarry Point, and there are rocky patches on it, with 13 to 19 feet at low water, at ¾ to 1¼ miles offshore.

Little River is 1.8 miles westward of Quarry Head; it admits boats at high water; there is a settlement with a church near its entrance.

Pomquet or Bayfield Island, which bears 254° 7¾ miles from Cape Jack, and 154°, 14¼ miles, from Cape George, 900 yards long north and south, about 270 yards broad, of red sandstone, 25 feet high, and wooded. It is joined by a reef to Pomquet Point, which is 330 yards southwestward of it, and this reef dries out more than halfway from the point to the island, leaving a passage with 3 feet in it at low water. Shallow water extends 800 yards northeastward of the island, and a reef, with a large rock at its end, dries out 300 yards from the eastern point of the island.

Pomquet Island Light, fixed red, 50 feet above high water, visible 9 miles, is exhibited from a square white tower on the northeastern end of Pomquet Island.

Pomquet Banks lie between 3 and 6 miles northward of Pomquet Island. The banks are rocky, with irregular soundings of 6 to 10 fathoms, the least water of 6 fathoms being situated with Pomquet Island Lighthouse bearing 176°, distant 5½ miles.

Pomquet Road, the bay between Pomquet Point and Little River, is considered safe during summer, but the riding must be very heavy in northeasterly gales. The road is sheltered by the island and its reefs, excepting from between north and east.

Bayfield Breakwater, 700 feet long, extends along the reef off Pomquet Point, but it was seriously damaged in 1902; Bayfield Wharf, 442 feet in length, extends into the road about ¼ mile southward of Pomquet Point, and it has a depth of 11 feet at low water at its outer end.

Anchorage.—There is anchorage in 3 to 6 fathoms, sandy bottom, but the best sheltered berth is in 4 fathoms at low water, with the southern point of the island bearing 353°, distant ½ mile.

Directions.—Approaching this anchorage from the eastward avoid Bowman Bank, if the draft makes it necessary, by keeping Pomquet Island Lighthouse southward of 230°, or in not less than 7 fathoms water, until the northern point of the bank is passed. From the northward, pass ½ mile eastward of Pomquet Island, or in not less than 8 fathoms water, until Pomquet Point opens southward of the island, when haul westward into the bay.

Pomquet Harbor entrance is at the eastern end of a range of low sand hills and sand beach, 1.8 miles westward of Pomquet Island Lighthouse, and in the bay between it and Monk Head. It is an extensive place, branching into two principal and many smaller inlets, coves, and islets, and is navigable for small craft and boats nearly 3 miles in from the sea, but it is of no use to shipping, having usually only a depth of 2 feet at low water in the narrow channel over its shifting bar of sand. The principal settlements and the church are on the western shore of the northwest arm; the Indians have a chapel and a reservation of land on the eastern and larger branch, into the head of which Pomquet River, a small stream, flows.

Tides.—High water interval at Pomquet Harbor is 9h. 25m.; mean range, 2.9 feet; spring range, 3.1 feet.

Deloreys Beach Breakwater extends eastward from the point 1¼ miles northwestward from Pomquet Harbor entrance.

Monk Head is a cliff of gypsum, 45 feet high, bearing 288° 3.9 miles from Pomquet Island Lighthouse. A rocky bank, with 3 fathoms least water, extends ¾ mile eastward of it, and there is a patch of 4½ fathoms, 1½ miles 76° from the head.

A large sheet of water westward of Monk Head, locally known as Duns Lake, is separated from the bay by a beach of sand, and from Antigonish Harbor by marshy land. A channel for boats, about 700 feet in length, has been opened between Duns Lake and Antigonish Harbor.

Antigonish Harbor, 2.6 miles westward of Monk Head, is nearly 200 yards wide at its entrance, between low points of sand, off which a dangerous bar extends eastward ½ mile. The bar and the deep water up the harbor are marked by spar buoys on either side. The bar has a depth of 6 feet at low water, but both the depth and direction of the very narrow channel over it change occasionally.

The harbor is of great extent, running in southwestward 6 miles; the channel, between flats of mud and weeds, is 9 to 36 feet deep for about 4 miles within the entrance. The scenery is exceedingly beautiful, the shores being broken into numerous coves, points, and islets, while a range of hills rises 760 feet behind the western shore. There are flourishing farms on either side.

Anchorage off the bar is not good, the bottom being rocky, and it would be unsafe in a northeasterly gale.

Tides and tidal currents.—It is high water, full and change, in the entrance of Antigonish Harbor, at 9h. 0.0m.; springs rise 4 feet, neaps 2 feet. Northerly winds raise the level of the water, and southerly winds lower it. The velocity of the current in the entrance seldom exceeds 2 knots, except that of the ebb, in spring, after the melting of the snow.

Antigonish Village, containing about 600 inhabitants and two churches, stands at the head of the western arm, 6¼ miles from the entrance. Gypsum abounds here, forming, with lumber and agricultural produce, the cargoes of the schooners which frequent the harbor. There is a station of the Intercolonial Railway at Antigonish.

Ogden Pond, 1¾ miles northward of Antigonish Harbor entrance, is about 100 acres in extent, 10 feet deep, and is separated from the bay by a sand beach 130 to 250 feet in width. A channel, 30 feet wide, and about 1½ feet deep at low water, has been cut through the beach, rendering the pond accessible to small craft.

McIsaac Rock, with 9 feet least water, is the middle of a small detached shoal, nearly 600 yards offshore, between McIsaac Point and a remarkable patch of white gypsum cliff. The rock is 2¼ miles northward of Antigonish Harbor entrance, and bears about 46°, 1,200 yards from the gypsum patch; it is marked occasionally by heavy breakers.

Piers.—A pier extends about 300 feet southward of Crebbing Head, 4 miles northward of Antigonish Harbor entrance. A breakwater, 330 feet long, extends from the northern side of McNairs Cove, about 2 miles southward of Cape George; the depth at its outer end is 12 feet at low water.

Cape George, the northwestern point of the bay, is a bold and precipitous headland, principally of slate conglomerate, and trap rocks, rising about 1½ miles westward of the cape, 600 feet above the sea. Shallow water extends ¼ mile off the cape, and as there is a depth of 20 fathoms ½ mile off it, little warning of approach is given by the lead. There is a church westward of the lighthouse. Anchorage may be obtained in westerly winds off Ballantyne Cove, on the southeastern side of Cape George Headland, but the ground is not good.

Cape George Light, group flashing white, 360 feet above high water, visible 26 miles, is exhibited from a white octagonal wooden building, with red lantern, on the southeastern extremity of the cape 276°, 478 yards from Eachren Point.

Tides.—High water interval at Cape George is 9h. 08m.; spring range 2.8 feet, mean range 2.2 feet.

Tidal currents.—The flood current from the north entrance of the gut sets nearly toward Cape George, diminishing rapidly in strength as it expands in advancing northward. It is weak in the western part of George Bay, sweeping round it to the northwest, with slight indraughts toward Pomquet and Antigonish. The ebb current sets in the contrary direction.

On the eastern side of George Bay, the flood current from the gut is usually met by a much weaker and contrary current of flood, setting southwestward along the western coast of Cape Breton. These opposing flood currents generally unite somewhere off Judique Shoals, and then set northwestward. The two corresponding ebb currents generally separate at about the same place, one setting toward the gut, with increasing strength, as it proceeds southward, and the other in the contrary direction, toward Port Hood. This must be understood to be of usual, and not of constant, occurrence, since the currents partake of the irregularity in velocity and duration of the tidal currents of the Gut of Canso.

The northwest coast of Cape Breton Island from Cape North to Cape St. Lawrence is 7 miles westward, and from thence to the coast trends about 213° to Cape Linzee at 1½ miles northward of Port Hood, a distance of 73 miles, without either a harbor or safe anchorage for ships. Its general character is high and bold, the shoals being few and close inshore.

The prevailing rocks of this coast are sandstones, shales, and conglomerates, with occasional beds of gypsum and thin seams of coal, together with a more ancient slate formation in nearly vertical strata, forming the higher hills and rising in one part nearly 1,300 feet above the sea. These rocks are precipitous, and boats can land on the coast only in fine weather, at the mouth of ravines or small streams. The mountains as far southward as Cheticamp approach close to the shore, excepting at Grandance, where there is a small settlement. From Cheticamp the settlements continue southward along the coast. The soil, especially in the valleys and lower grounds, appears to be productive and well suited to the rearing of cattle, considerable quantities of which are annually exported from Margaree and Mabou rivers.

The fisheries are valuable. Salmon are taken in all the principal streams, and the Margaree is so celebrated for its salmon fishery that it has sometimes been called the Salmon River. Herring, mackerel, cod, etc., abound in their seasons, and are frequently taken in large quantities. The seal fishery is also attempted occasionally, but is a precarious pursuit.

Caution.—This coast is dangerous to be near in autumn or early winter, when the prevailing northwesterly winds send in a heavy sea, and the set of the current is often toward the land. The swell frequently precedes the wind by many hours, and as there is no good holding ground, sailing vessels must not be caught close inshore.

Currents.—The Cape Breton current, on the west side of Cabot Strait for a width of some 18 miles from Cape North, flows constantly to the southeast, attaining its greatest velocity near Cape North, where it may be as much as 2 knots. It is checked or reversed for a few days at a time by heavy southeasterly winds. Even with a smooth sea and in fine summer weather there is a set toward this northwest coast, due sometimes to the general southeasterly current running between Magdalen Islands and Prince Edward Island, and at other times to the ebb, or northeast-going tidal current inclining toward it. These currents, being inconstant and irregular both in velocity and direction, must be guarded against. In summer the velocity of the current does not exceed 1 knot even close inshore, excepting round Cape St. Lawrence and Cape North, where the velocity is sometimes 2 knots, causing a heavy breaking sea. The direction of the combined currents for three-fourths of the time is eastward. Winds, present or at a distance, also influence these currents, as they do in all parts of the gulf.

The coast from Cape Linzee, the northern point of George Bay, immediately northward of Port Hood, trends northeastward for 4 miles to Mabou River.

Mabou River is entered over the bar by a dredged channel 100 feet in minimum width and 12 feet in depth at low water springs. There is a breakwater pier, 835 feet in length, on the southern side of the channel, and a stonework extends about 1,600 feet out from its outer end; the inner end of this stonework is 8 feet above and the outer end 5 feet below extreme low water. The bar is about 200 yards seaward from the outer end of the pier.

From the entrance to the bridge, a distance of 3¼ miles, this river resembles a mountain lake, being in one part ¾ mile wide and carrying 5 to 8 fathoms water. Boats can ascend with the tide to about 2 miles above the bridge, where the fresh water forms only a small stream. The Mabou is joined at about 2¼ miles within its entrance by Southwest Arm and Becket River, two smaller streams.

The shores of the Mabou are well settled, principally by Scotch highlanders; there are flourishing farms on either side, and a chapel on the right bank at 3 miles within the entrance. The scenery is very beautiful, the hills rising immediately from the northern shore to the height of 870 feet.

There are two wharves on the northern side of the river at 800 and 1,200 yards, respectively, within the outer end of the breakwater pier, where vessels lie to ship gypsum.

Owing to the narrowness of the channel and the rapidity of the tidal currents, it is dangerous to enter Mabou River, except with a flood current and a smooth sea; local knowledge is desirable.

Mabou Range Lights.—A fixed white, 30 feet above high water, visible 9 miles, is exhibited from a white square wooden structure on the breakwater pier on the southern side of the dredged channel.

A fixed red, 44 feet above high water, visible 7 miles, is exhibited from a similar structure on the north shore at McFayden's Wharf and distant about 700 yards from the preceding light.

The lights in line lead through the dredged channel up to the breakwater.

Buoys.—The southern side of the dredged channel is marked at its outer end by a red conical iron buoy and three red spar buoys closer in; the northern side by a black iron can buoy and a black spar buoy closer in.

Coal Mine Cove is about 2 miles northeastward of Green Point, the northeastern entrance point of Mabou River, and in it there is a breakwater pier 320 feet long and a wharf 160 feet long, with 18 feet water at their ends and double railway tracks to the mine. In fine weather these wharves can be used for shipping coal.

Mabou High Land rises 1,000 feet above the sea southward of Inverness and extends 11 miles southwestward along the coast, which is lofty and precipitous to Mabou River. It is very remarkable, and there are fewer landing places and settlements.

Sight Point is about 7 miles southwestward of Inverness, and a small breakwater has been constructed here to shelter a landing place for boats. There is a small wharf at Finlay Point, 3½ miles to the southward.

Inverness is an incorporated mining town on the shore of Broad Cove, 13 miles southwestward from Margaree River entrance and about midway between it and Mabou River entrance. The population by census of 1911 was 2,719. It is the terminus of the Inverness & Richmond Railway from Port Hastings. A steamer from Pictou calls weekly, and there is a telegraph office.

McIsaac Pond, now Inverness Harbor, is separated from the sea by a sand beach about 400 feet in width, through which a channel, which was dredged years ago and abandoned later, was (1913) being reopened and protected, and when completed is intended to be 50 feet wide at the bottom and dredged to a depth of 12 feet at low water.

Sea Wolf Island, 8 miles southwestward of Margaree River entrance and 2¼ miles offshore, is 1.1 miles long northeast and southwest, 600 yards broad, and about 260 feet high. It is sandstone, precipitous, and bold all around, excepting at its northeastern end, where shallow water extends off 200 yards. It affords some shelter to small fishing vessels and boats, which can land upon it in fine summer weather; at other times the sea rolls completely around the island, and the anchorage is never safe, the ground being everywhere rocky.

The depth between this island and the shore is 7 fathoms, bottom rock, with loose sand and gravel occasionally.

The sea in its vicinity abounds with fish.

Sea Wolf Island Light, fixed white, 298 feet above high water, visible 21 miles, is exhibited from a square white lighthouse, with a dwelling attached, on the summit and near the middle of Sea Wolf Island.

When in dangerous proximity to the island the light may be obscured by the abrupt cliffs of the island.

Margaree River, 10 miles southward of Cheticamp Point, has a very narrow and intricate channel, through which the tidal currents run with a velocity of 4 knots, and its entrance is obstructed by a bar of shifting sand, over which there is at times a depth of only 5 feet at lowest water. A breakwater has been built on the southwestern side of the entrance and beach protection works constructed on the northeastern side. It is only under favorable circumstances of wind and weather and with a smooth sea that small vessels can safely enter the river. The surf on the bar is at times heavy and dangerous to boats, especially when the strong tidal current is running out against wind and sea. Boats can ascend about 6 miles from the entrance, at which distance the tide ends. The shores of the river are well settled, principally by Acadians and Scotch highlanders, who, besides farming, prosecute the salmon and other fisheries.

Range lights.—A fixed red light, 75 feet above high water, visible 10 miles, is exhibited from a square pyramidal white lighthouse, on the western side of the entrance of Margaree River and 56 yards within the bank facing the channel entrance.

Another fixed red light, 105 feet above high water, visible 10 miles, is exhibited from a similar lighthouse, at 166° 72 yards from the preceding lighthouse.

The range leads into Margaree Harbor at Margaree River entrance, clear of the breakwater on the southwestern side of the entrance.

Soundings recently taken in the entrance to Margaree Harbor show that considerable shoaling has taken place in the dredged channel. In the portion lying eastward of the breakwater on the western side of the entrance, depths as little as 3.8 and 4 feet at low water were found. In the channel outside the breakwater over a distance of 350 feet from its outer end, depths as little as 6.5 and 6.7 feet at low water were found.

Vessels not having local knowledge are advised not to attempt to enter the harbor on the range.

Friar Head is 4½ miles southward of Cheticamp Point, and there is a fishing station 2 miles southward of the head, where a short breakwater has been built to protect a small wharf and the boat anchorage, which is locally known as Friar Head Boat Harbor.

Friar Head Light, fixed white, 84 feet above high water, visible 7 miles, is exhibited from a white pole on the cliff above Friar Head Boat Harbor.

Grand Etang.—There are several places between Cheticamp Island and Margaree River, where boats can land in fine weather, especially at Grand Etang (Squirrel Pond), distant 3 miles from Cheticamp Point. There are farms all along this coast, which becomes high at a short distance inland. Mount Squirrel, 1,220 feet high, situated within Grand Etang, is the highest part.

A channel has been opened through the beach which separated the waters of the gulf from the deep Grand Etang, and protection works have been carried out to make the pond available for sheltering small vessels and fishing boats. A bridge 563 feet long crosses the pond, and it has an opening for boats. A depth of 9½ feet at low water has been obtained by recent dredging in the channel and pond. and efforts are being made to increase this to 12 feet, but the soft, almost liquid, mud runs into the dredged area from the banks. A steamer from Pictou calls at Grand Etang weekly. There is a telegraph office.

Grand Etang Light, fixed red, 24 feet above high water, visible 6 miles, is exhibited from a square white lighthouse near the outer end of the breakwater on the southern side of the channel leading into Grand Etang.

Cheticamp Eastern Harbor lies between Cheticamp Island and the mainland, and its entrance is between the shingle spit at Cape Gros, the northeastern end of the island, and Caveau Point. Small fishing vessels sometimes anchor within this entrance, and outside the bar, which is ½ mile farther in, but northerly winds send in so heavy a sea that this anchorage is even less secure than that at the southwestern end of the island. There is a depth of 3½ fathoms within the harbor, and there was only 2 feet at low water over its bar of sand, then in great part dry, but the channel over the bar has been dredged to a depth of 16 feet for a width of 100 feet. There is good anchorage for vessels inside, and numbers of fishing and other vessels run for this harbor for shelter in bad weather. There are several wharves and a Government pier in the harbor.

Cheticamp Island, 3¼ miles long, north and south, and about 1,600 yards wide, is united at its southern end to the mainland by a low and narrow beach of sand and shingle, which high tides overflow.

The principal fishing station on this coast is on Cheticamp Point, the southwestern point of the island, where there are buildings, fish stages, and a flagstaff.

There is no landing on the seaward coast of Cheticamp Island, where, for its whole length, from Cheticamp Point to Enragée Point, are perpendicular or overhanging cliffs of sandstone, containing coal fossils; these cliffs are nearly as high as any part of the island, which is 200 feet in height, and they are being constantly undermined by the sea.

Cheticamp Island Light, occulting white, 149 feet above high water, visible 18 miles, is exhibited from a square white lighthouse with a red lantern on Cheticamp Point. A dwelling is attached to the lighthouse.

Range lights.—A fixed red light, 52 feet above high water, visible 8 miles, is exhibited from a square white wooden tower on Caveau Point.

A fixed white light, 98 feet above high water, visible 8 miles, is exhibited from a similar lighthouse, 250 yards 104° from the preceding light.

These lights in line, bearing 104°, lead into the entrance of Cheticamp Eastern Harbor, clear of the northeastern end of Cheticamp Island and between it and Caveau Shoals.

A fixed white light, 45 feet above high water, visible 8 miles, is exhibited from a square white tower, with a red lantern on the eastern side of Cheticamp Eastern Harbor.

Another fixed white light is shown, at 82 feet above high water, from a square white tower with a red lantern, 303 yards 185° from the preceding light.

These lighthouses in line, lead 185° through the dredged channel, which is marked by spar buoys on both sides, to the anchorage in Eastern Harbor.

In addition to the spar buoys marking the dredged channel over the bar, a black spar buoy marks the eastern limit of good water on Caveau Point range line, and a red spar buoy marks the end of the shoal extending northeastward from the northeastern end of Cheticamp Island.

Directions.—Caveau Point Range Lights should be kept in line up to the alignment of Cheticamp Harbor leading lights, to clear the shoal water abreast the northeastern end of Cheticamp Island, as indicated by above spar buoys, thence the alignment of Cheticamp Harbor Range Lights should be followed through the dredged channel and to the wharves.

Anchorage.—Within Cheticamp Point there is indifferent summer anchorage in 4½ fathoms, which receives some shelter from the shoal extending ½ mile southward from Cheticamp Point, but is completely open to winds from southwest to northwest, which send in a heavy sea. The sand and gravel bottom is so loose and bad for holding that the anchorage is unsafe after August, and at no time is it recommended. Vessels merely wishing to communicate with the shore should anchor outside 1 or 2 miles distant, with room to weigh if a westerly wind sets in.

Tides.—High water interval at Cheticamp Island Light is 8h. 50m.; mean range 2.1 feet, spring range 2.7 feet.

Settlement.—There is a settlement of Acadians on the mainland side of the harbor and there are some houses on the island side. A steamer from Pictou calls here weekly, and there is a telegraph office.

Storm signals are exhibited at Cheticamp.

Lifeboat.—A motor lifeboat is stationed at Cheticamp.

Supplies.—Fresh provisions in a limited quantity can be obtained. Water can be taken from the streams on the eastern side of the harbor, but on the island it is scarce and not good.

Caveau Shoals, which lie in the approach to Cheticamp Eastern Harbor, ½ mile off Caveau Point, and from 600 yards to ¾ mile northeastward of Cape Gros, are two rocky patches, with 9 feet least water.

A black bell buoy, marked "Caveau Shoal," is moored in a depth of 11 fathoms 100 yards westward of these shoals.

Jerome Ledge, with only 5 feet water, is about 1,400 yards long, north and south, 600 yards wide, and its northeastern point lies about 2 miles 31° from Cape Gros, the northeastern end of Cheticamp Island, and 1 mile from the shore, about 1 mile southward of Presqu'île.

There is a depth of 10 fathoms water 600 yards outside this ledge and Caveau Shoals; therefore, little warning is given by the lead, but the points of Cheticamp Island, namely Enragée Point and The Capes, in line, bearing 209°, leads northwestward of them.

Between Presqu'île and Grandance, 11½ miles northeastward, there are no inhabitants nor any good landing place, and the mountains lie close to the shore; but southward of Presqu'île the mountains recede from the shore, and settlements commence in the neighborhood of Cheticamp.

At Grandance there is a small settlement and a river, or stream, silted up by a shingle beach, on which boats land, and are hauled up if necessary. It seems to be known locally as Pleasant Bay, where a steamer from Pictou calls weekly.

The coast from Grandance to Cape St. Lawrence, a distance of 13 miles northeastward, is high and precipitous, the land within it rising from 700 to 1,100 feet; landing for boats is only possible with a smooth sea at one or two places, and even there it is indifferent.

Cape St. Lawrence, the northern point of Cape Breton Island, is of slate rock; it affords landing only on its western side, where there is a brook, and a steep stony beach, on which a boat can be hauled up with difficulty. Bear Hill, a remarkable sugar loaf, 750 feet high, is about 1,600 yards southeastward of Cape St. Lawrence, and close to the coast.

Cape St. Lawrence Light, fixed white, 137 feet above high water, visible 17 miles, is exhibited from a square white lighthouse, with a red lantern, with a dwelling attached, on the northern extremity of Cape St. Lawrence.

St. Lawrence Bay.—Black Point bears 264° 4.7 miles from Cape North, and St. Lawrence Bay, lying between them, is 1¾ miles deep, with bold shores, and depths of water under about 20 fathoms, but the bottom is either of rock or loose sand. The bay affords temporary open anchorage in summer, when strong northerly winds are of rare occurrence, in 9 to 10 fathoms water, ½ mile offshore in the head of the bay, but vessels must weigh immediately a wind from seaward sets in. There are settlements and good landing at Wreck Cove, in the southwestern part of the bay, and at Deadman Pond, in the southeastern part, the principal fishing establishment being at Deadman Pond.

Storm signals.—There is a storm-signal station on the bluff eastward of the breakwater in St. Lawrence Bay.

Meat Cove lies between Black Point and a point ¾ mile farther westward. Shag Rock lies rather more than 200 yards westward of the inner part of Black Point. Black Rock, always above water, lies 600 yards northwestward of the northwestern point of Meat Cove, and 330 yards offshore. There is a settlement and good landing for boats in the cove.

CHAPTER VII.

CAPE BRETON ISLAND, EAST AND SOUTHEAST COASTS—CAPE NORTH TO MICHAUX POINT.

Cape Breton Island.—The east coast from Cape North to St. Ann Harbor, a distance of 47 miles to the southward, is bold, mountainous, and free from outlying dangers, until near Ciboux Island. The mountains attain the height of 1,392 feet above the sea, and are primary and metamorphic rocks, chiefly granite, with clay slate, in nearly vertical strata. These rocks form the principal headlands, while sandstone, conglomerate, shale, limestone, and occasionally beds of gypsum and red and yellow marl occur between them. The last-named rocks, the lowest members of the coal formation, rest unconformably on the older rocks, and are occasionally covered with beds of drift sand, red clay, and bowlders; they are exposed in the valleys, and are displayed on the eastern slopes of the mountains, where they form the coast cliffs. They furnish, with the beds of drift, a tolerably productive soil, which supports, with the aid of the fisheries, a thinly scattered population.

Currents.—Notwithstanding the bold nature of this coast, wrecks have occurred upon it in the dense fogs which accompany easterly winds. The wrecked vessels have generally been steering a supposed safe course to pass northward of St. Paul Island into the Gulf of St. Lawrence, but the current which so frequently runs south-southeastward out of the gulf was not allowed for.

After long-continued easterly or northeasterly winds, which raise the level of the water in Bras d'Or Lake and neighboring harbors, it is not unusual to find a current, with a velocity of 1 knot, running for several successive days along the land from off St. Ann to near Cape North, where it meets the current out of the gulf and is turned to the eastward, causing a great rippling. The fishermen affirm that it as often runs in the opposite direction, and also that at times there is a regular alternation of the flood and ebb tidal currents.

Owing to the inconstant nature of these currents, great caution is required when approaching this coast in fogs.

Cape North, the northeastern extremity of Cape Breton Island, is a bold, steep, slate rock headland, in nearly vertical strata, rising abruptly 1,000 feet above the sea. The Cape is steep-to, with some rocks above water close off it, and these rocks extend over 200 yards off Money Point, 1 mile southeastward of the cape.

The passage between the cape and St. Paul Island is 13 miles wide, and clear, with very deep water. Violent squalls are frequent off the headland.

Cape North Light, flashing white, visible 16 miles, 110 feet above high water, is exhibited from a red cylindrical iron tower, erected on Money Point.

A fog signal is made at this lighthouse, from a white rectangular wooden structure, with red roof; a white dwelling is situated westward of the fog signal building.

Marine signal and telegraph station.—There is a marine signal and telegraph station at the lighthouse. This signal station is included in Lloyd's system.

Tides.—The high water interval at Cape North is 8h. 35m.; mean range 2.4 feet, spring range 3.1 feet.

St. Paul Island, in Cabot Strait, the main entrance to the Gulf of St. Lawrence, between the southwestern extremity of Newfoundland and the northern extremity of Cape Breton Island, is composed of primary rocks, principally mica slate, dipping at an angle of about 45° to the southward. It is 3 miles long, north-northeast and south-southwest, and nearly 1 mile broad. Its north-northeastern point is a small detached rock (although from the sea it appears connected), separated by a very narrow channel from a peninsula, about 400 feet high, which, together with the isthmus joining it to the body of the island, is so precipitous as to be nearly inaccessible. The remaining and greater part of the island is also steep and precipitous toward the sea, and rises in two parallel ranges of hills; that on the southeastern coast being the higher and attaining an elevation of 500 feet.

In a valley running between these hills are two ponds at some 250 feet above the sea; these ponds supply a stream, which is about 6 feet wide, and flows into the sea in the southern part of Trinity Cove; its water is of a yellowish-brown color, but of good taste and is wholesome. There are several other much smaller runs of water, one of which enters Atlantic Cove on the eastern side of the island, each being nearly 1 mile from its south-southwestern point; and they afford the only shelter for boats and the only good landing on the island, which is easier of ascent from them than from any other part. The island is partly wooded with dwarf and scrubby spruce trees, which are of no use except for fuel.

The island belongs to the Province of Nova Scotia.

About ½ mile off the island the water becomes deep, so that in approaching it in foggy weather there is little or no warning by the lead. Although the island is so bold and high many shipwrecks, attended with loss of life, have occurred upon it.

The varying currents add much to the danger arising from the fogs, which prevail in southerly, easterly, and often in southwesterly winds.

Provision depot.—A depot of provisions, furnished by the Government of the Dominion of Canada, for the relief of shipwrecked persons, is on the northern point of Trinity Cove, where there is also a dwelling house for the men in charge, and a store. Fish are plentiful around the island.

Anchorage.—Small fishing vessels anchor off Trinity and Atlantic coves, with offshore winds, 400 yards from the rocks, in 10 to 12 fathoms, sand and gravel bottom. In very fine weather large vessels might ride with a stream anchor about ½ mile offshore in 25 to 30 fathoms; but such vessels must be ready to weigh at the first sign of a change of weather.

Atlantic Cove—Tide-gauge house.—A white tide-gauge house, which is conspicuous from seaward, stands about 40 feet above the high water mark on the western shore of Atlantic Cove.

Beacons.—Two beacons with white circular tops are on the hill in the bight of the cove above the tide-gauge house, and in range, bearing 299°, lead well clear of Big Dick Rock, a detached rock on which the sea breaks heavily, lying off the northeastern point of the cove. There are also two diamond-shaped white beacons about 70 yards eastward of the superintendent's house, which in range, bearing 344°, lead clear of the foul ground off the southeastern point of the cove, and indicate the best anchorage in 18 fathoms where their alinement intersects that of the two above-mentioned circular-topped beacons.

These beacons are intended for the guidance of vessels calling at the cove with supplies and mails as well as for small schooners and fishing vessels.

North Point Light, fixed white, 140 feet above high water, visible 18 miles, is exhibited from a white octagonal wooden tower erected on rock off point. The light is kept in operation as long as traffic is open, without reference to fixed dates.

A diaphone fog signal is sounded from a white square wooden building with red roof, elevated 80 feet above high water. The horn points in a 53° direction.

South Point Light, group flashing white, 156 feet above high water, visible 18 miles, is exhibited from a red cylindrical iron tower erected on the point. The light is kept in operation throughout the year. (See Light List.)

Marine signal and telegraph station.—There is a telegraph and signal station at the main establishment on St. Paul Island, on the northeastern point of Atlantic Cove, about 300 yards eastward of the superintendent's house.

There is no signal station at either of the lighthouses, and signals made that are not visible from the Atlantic Cove Station are not forwarded. Therefore, in communicating with this station the signals should be made from positions that are visible from Atlantic Cove and well clear of the cliffs either northward or southward.

This signal station is included in Lloyd's system.

The telegraph cable runs from the island to Meat Cove, at the northern end of Cape Breton Island. A land wire crosses the island from Atlantic Cove to Trinity Cove.

Ice report.—This signal station is supplied with information as to ice, winds, temperature, and weather indications, which it communicates by signal to vessels requesting it.

Tides.—The high water interval at St. Paul Island is 8h. 30m.; spring range 2.7 feet, mean range 2.1 feet.

Life-saving station.—A lifeboat and a Lyle gun are maintained at St. Paul Island.

Lifeboat at Atlantic Cove, eastern side of island; and a lifeboat at Trinity Cove, western side of island.

Aspy Bay.—White Head lies 8 miles 171° from the southeastern point of Cape North Headland, and Aspy Bay, situated between them, is 4½ mile deep.

On the northwestern side of the bay, 5¾ miles 210° from Cape North, is Wilkie Sugarloaf, a remarkable conical mountain 1,200 feet high.

To the southward of the Sugarloaf, and occupying the head of the bay, are three ponds with narrow entrances through sandy beaches, and into which boats can only pass at high water. The northern and largest of these ponds has several islands in it, and a depth of 3 fathoms; it extends 3 miles inland, and a large brook, called Aspy River, flows into its head. It has often a depth of 3 feet in its entrance after the melting of the winter snows, but in summer seldom more than a foot at low water. A church stands far back on the hills within the middle of the bay.

Anchorage.—The best anchorage in Aspy Bay with northwesterly winds is off North Pond, in 8 to 9 fathoms, sand bottom, and with southerly winds off South Pond, or in the cove under White Head. which has a small island lying close off it. In this cove there is a small wharf, and good landing for boats in all but northerly winds. It is the anchorage generally preferred, especially by small vessels, as being the least embayed, and the most sheltered from the prevailing southeasterly swell. Fishermen state that there is good holding ground in this cove inside the depth of 10 fathoms, blue mud bottom. If unable to beat round Cape North, or in want of supplies, this bay affords convenient anchorage; but it is only safe in fine weather, and with westerly winds; it is necessary to be ready to weigh immediately should a wind from seaward set in.

Point White Light, fixed white, 53 feet above high water, visible 10 miles, is exhibited from a pole situated 334 feet 59° from the northwestern corner of the wharf in the small cove under White Point.

Storm signals.—There is a storm signal station at Dingwall, situated on the south side of North Pond.

Settlements.—There are flourishing farms in the vicinity of the shores of Aspy Bay, and settlements at the ponds.

Cattle, sheep, butter, and oak staves are exported, chiefly to St. Pierre.

The fishermen supply the Newfoundland fisheries with a large quantity of squid for bait.

A fishing village is situated on a barren part of the bay inside White Head.

Supplies.—Fresh provisions and water may be obtained from the settlements at the ponds.

Cape Egmont, southeastward, 3¼ miles from White Head, is a comparatively low headland of granite, and nearly bare of trees.

Neil Harbor, situated about 2½ miles southwestward of Cape Egmont, is at the entrance of a small bay open to the southward and southeastward, and extending inland about ½ mile. It is sheltered from the northeastward by Neil Head, a rocky promontory, 10 to 20 feet high. The harbor is a large and important fishing station, and, for the purpose of protecting the anchorage in southeasterly gales, a breakwater has been constructed off the southern part of Neil Head; it extends into a depth of 17 feet at low water. There is a telegraph office here.

There is a storm signal station on Shoal Point, in Neil Harbor.

Neil Harbor Light, fixed white, 73 feet above high water, visible 14 miles, is exhibited from a square white lighthouse, with an octagonal red lantern on the edge of the outer part of Neil Head.

A fog signal at the lighthouse answers signals from vessels.

Neil Harbor Whistle Buoy, conical, surmounted by a whistle, is moored 1 mile southeastward of Neil Head Lighthouse.

South Point is situated about 1¼ miles to the southward of Neil Head, and a rocky shoal extends 400 yards eastward of it.

A black spar buoy is moored in 7½ fathoms water on the eastern end of the shoal off South Point.

Blackbrook Cove, about 1,400 yards southwestward of South Point, affords good landing for boats.

Green Cove, an indentation in the coast 1½ miles southward of Blackbrook Cove, 400 feet deep, and 900 feet in width, and protected on the southern side by a reef and from eastward by outlying ledges, is a small fishing station. A breakwater, 450 feet long, connects the inner ledge and the land.

Shoal.—There is a rocky shoal, with 2 fathoms least water, ½ mile from the shore at Rocky Bay, where there are several buildings, situated about 3½ miles to the southward of Black Point, the southwestern point of Blackbrook Cove.

Ingonish Island, 10 miles southward of Cape Egmont and ½ mile southeastward of Archibald Point, the northern point of Ingonish Bay, is of rock, ½ mile across, and 200 feet high. East Rocks, 12 feet high, extend nearly 800 yards eastward of the island. There are several high rocks close seaward of the island, and a small rock 160 yards off its southwestern point. The northwestern side of the island forms a small bay, around which there are several buildings, and small fishing vessels and boats shelter there from the southerly swell and from all but easterly winds. From the western point of this small bay a spit and reef extend nearly halfway across to Archibald Point, leaving a channel 18 feet in depth, but so narrow and crooked that only 14 feet can be relied on at low water.

Ingonish Island Light, fixed white, 237 feet above high water, visible 20 miles, is exhibited from a square white tower, rising from the roof of a dwelling, on Ingonish Island.

Ingonish Bay, between Archibald Point and Cape Smoke, 3¾ miles southward of the point, is 2¾ miles deep, and it is divided into North and South bays by Middle Head, a narrow, rocky, and precipitous peninsula 2 miles in length, 200 yards southeastward of which is Fisherman Rock, with a depth of 12 feet of water over it. There are several houses near the lake at the head of South Bay, and at some parts of North Bay, but the principal settlement of Ingonish is on the northern side of the bay, where, besides an establishment on the inner side of Archibald Point, there are houses, fish stages, and a small chapel.

The mountains in rear of Ingonish are the highest on this coast, and attain an elevation of 1,392 feet. Cape Smoke rises precipitously 950 feet above the sea.

The squalls from these high lands are at times very violent.

Breakwaters.—A breakwater, 484 feet in length, with an L end 77 feet long, has been built at Archibald Point in order to form a harbor of refuge for fishing boats. The depth of water along the face of the L is 11 feet at law water springs.

In 1912 a breakwater was constructed at Burkes Head, on the northern side of North Bay of Ingonish, 390 feet long, with an L 120 feet long along the channel face, which is in 15 feet at low water.

Anchorage.—Vessels usually anchor on the northern side of Ingonish Bay westward of Archibald Point, shifting their berths as the winds may render necessary. The bottom is a thin coating of sand over hard mud. The anchorage is unsafe with easterly winds, which send in a very heavy sea.

Storm signals are exhibited at North Ingonish.

South Bay.—At the head of South Bay there is a lake separated from the sea by a beach, through which a channel has been cut, giving access for vessels to the lake, which has an area of 400 acres and is deep, affording a safe and commodious harbor. This channel has now an average width of 130 feet and is 20 feet deep at low water.

There is a wharf, with 8½ feet at its outer end at low water, on the northern side of the lake near the entrance, and a wharf, with 16 feet at its outer end at low water, on the southern side of the lake near the entrance.

Ingonish Harbor Lights, fixed red, 45 feet above high water, visible 8 miles, is exhibited from a square white tower on the beach in South Bay. This light marks the south side of the entrance to the lake.

A fixed white light, 16 feet above high water, visible 9 miles, is exhibited from a white pole above a white shed with red roof, situated near the outer end of breakwater on north side of entrance.

Buoys.—Three red conical and three black spherical buoys mark the channel to South Ingonish Bay Harbor. Black spherical buoys also mark shoals off the eastern side of the entrance at head of new breakwater and off the steamboat wharf.

Telegraph stations.—There are telegraph offices at Ingonish North Bay, South Ingonish, and Ingonish Ferry.

The coast from Cape Smoke to Bentinck Point, 12½ miles to the southwestward, assumes a less sterile appearance, the mountains receding a short distance inland, so as to leave space for scattered farms. At French River, which is a brook, and especially at Breton Cove, where there is a small wharf, there is good landing for boats. About 3 miles southeastward of French River the 30-fathom curve turns off southeastward and passes outside Ciboux Shoal.

Storm signals are exhibited at Breton Cove about midway between South Ingonish Bay and St. Ann Harbor.

The coast from Bentinck Point to Island Point, a distance of 5½ miles southward, and thence to Beach Point, a further distance of 3½ miles in the same direction, forms the western side of St. Ann Bay, and shallow water extends 800 yards off it. There are cliffs of white gypsum 1½ miles southwestward of Bentinck Point and there is good landing at Indian Brook, 1 mile northward of Island Point. Island Point appears to be an island, but it is a small wooded peninsula, joined to the mainland by stony beaches inclosing Macdonald Pond.

St. Ann Beach, which separates St. Ann Bay and Harbor, extends from the coast about 2½ miles southwestward of Island Point, southward, 1¼ miles to Beach Point, its southern end, which is 180 yards from the eastern shore of St. Ann Bay. The beach is 200 to 400 feet in width and 5 to 7 feet high; it is composed of rolled stones and shingle, and besides forming a protection to the harbor, it is used as a highway to the ferry, which plies between Beach Point and English Town, on the eastern side of the harbor entrance.

The southeastern shore of St. Ann Bay is bold, the 5-fathom curve being about 250 yards off it.

St. Ann Harbor Light, fixed white, 41 feet above high water, visible 8 miles, is exhibited from a square white tower on Beach Point.

Cape Dauphin is a high and precipitous headland and the northeastern termination of the range of mountains which separates St. Ann Bay and Harbor from Bras d'Or.

From Cape Dauphin the shore of St. Ann Bay trends westward 1¼ miles to Cowdy Point, and thence 1 mile southwestward to Munro Beach, where there is a store, and it affords good landing for boats with offshore winds. From Munro Beach the shore continues southwestward 2½ miles to Fader Point, which is a cliff. Wilhausen Point, 1,800 yards, 231°, from Fader Point, is the first point of cliff outside the entrance of St. Ann Harbor, and between these two points is the beach of Oyster Pond. Bar Point is ¼ mile inside Wilhausen Point and ½ mile from the harbor entrance.

St. Ann Harbor extends about 4½ miles southwestward within St. Ann Beach; it has a general width of 1¼ miles, a depth of 7 to 9 fathoms, and it is completely sheltered. The entrance between Beach Point, which is quite bold, and Weed Pond Shoal carries 11 to 13 fathoms water, but is only 130 yards wide.

The velocity of the tidal currents in the entrance is 4 knots.

The mountains of St. Ann, which rise precipitously 1,070 feet above the sea, form the western shore of the harbor from the northern end of the beach to North Arm.

Bar.—About ¾ mile northward of the entrance there is a dangerous bar, about 400 yards wide, with depths of 12 feet, over which there is a narrow channel 150 feet wide, with a least depth of 20 feet (as improved by dredging in 1911). In a strong northeasterly wind, and especially with the ebb tide, the bar is covered with heavy breakers.

The channel over the bar is marked from Wilhausen Point to Old Fort Point by five black spar buoys on the eastern side, and three red spar buoys on the western side.

Port Shoal, with a least depth of 8 feet, mud, is on the western side of the entrance within the harbor, and it extends ½ mile southwestward from Beach Point; Weed Pond Beach and Bar Point in line lead close southeastward of the shoal.

A red spar buoy marks the northeastern end, and a red spar buoy the southeastern end of Port Shoal.

North Arm is on the western side of the harbor at 2¾ miles within the entrance, and North River, which flows into it, can be ascended by boats to a distance of 3 miles in a northerly direction. A wharf, with a depth of about 9 feet water at its outer end, extends about 240 feet off Seymour Point, at the head of North Arm.

Munro Point Light, fixed red, 67 feet above high water, visible 9 miles, is exhibited from a white wooden tower on the southeastern extremity of Munro Point.

Munro Cove, on the southern side of Munro Point, which is the southern entrance point of North Arm, has Shipyard Rock, with 10 feet of water in its entrance.

Macleod Point divides the head of the harbor into two arms. There is a gypsum cliff here, and shoal water extends 800 yards northeastward of the point.

South Arm is the arm on the eastern side of Macleod Point, and it is locally known as South Gut. There is a wharf here, 198 feet in length, and extending into 8 feet at low water. A steamer calls here twice a week on her trips from Sydney to the ports on the coast to northeastward. There is a telegraph office. The kirk stands near the head of Black Cove, a convenient boat cove on the western side, and near the manse, or residence, of the minister. The greater part of the inhabitants of the harbor are highlanders, who subsist by very indifferent farming, aided by occasional employment in the fisheries, and in preparing lumber.

Old Fort Point is at the southeastern side of the entrance of the harbor; there is a small green mound of an old fort on the point.

Immediately northeastward of Old Fort Point Weed Pond stony beach commences; a rocky ledge, with 2 feet least water, extends 80 yards off this beach and continues northeastward to Bar Point, ½ mile from the entrance. Lead In Point and Conway Point are the two points next within Old Fort Point, on the southeastern shore of the harbor.

Directions.—For St. Ann Harbor from the northward pass northwestward of Ciboux and Hertford islands, and do not approach the shore between Bentinck and Island points to a depth less than 7 fathoms. Bentinck Point and Cape Smoke in line clear the shoal off Island Point in 5 fathoms; in approaching the bar keep Cape Smoke open. While northeastward of the bar, the northeastern edge of which is steep-to, bring the white gypsum cliff of Macleod Point in line with the summit of Old Fort Point, bearing 210°, which mark leads over the bar in the deepest water between the outer red and black spar buoys until Fader Point is just open of Wilhausen Point (the vessel is then about 100 yards from Bar Point). If the gypsum cliff of Macleod Point can not be made out, pass Wilhausen Point at the distance of 200 yards and steer 210° from Old Fort Point until Fader Point is just open of Wilhausen Point. Then, to avoid the rocky ledge, with 2 feet least water on it, which extends 80 yards offshore between Bar Point and the entrance, keep Fader Point a little open of Wilhausen Point, astern (passing between the inner red and black spar buoys), until Conway Point opens westward of Lead In Point, or until the gypsum cliff of Macleod Point is open half a point southward of Beach Point, or until Beach Point bears 212°, distant ¼ mile; then, keeping Conway Point open (to avoid Weed Pond Ledge), steer so as to pass Beach Point at a distance of between 60 and 100 yards.

Avoid Port Shoal by not opening Bar Point northward of Weed Pond Beach until Price Point, which is shingle, bears northward of 290°, then haul to the northwestward and anchor westward of Port Shoal in 8 fathoms, mud, and out of the stream of the entrance.

Anchorage.—The best sheltered anchorage is in the entrance of North Arm, the riding elsewhere in so large a harbor being at times rather rough for a small vessel.

Caution.—Northeasterly gales, on entering this harbor, between mountains 1,000 feet high and only 2 miles apart, are violent. These gales blow at any time after the middle of August, and a vessel should be well moored.

Tides.—The high water intreval in St. Ann Harbor is 8h. 25m.; mean range, 4.9 feet; spring range, 6 feet.

It is high water 10 minutes earlier on the bar, and the rise there is about 1 foot less. The velocity of the tidal currents in the entrance is 3 to 4 knots.

Water.—The best watering place is on the western side of St. Ann Harbor, 1¾ miles within the entrance, where a torrent descends a ravine.

Hertford and Ciboux Islands, including Ciboux Shoal, extend 3 miles 37° from a position 1¼ miles 28° from Cape Dauphin. They are long and narrow islands of sandstone, precipitous on every side, nearly bare of trees, and ½ mile apart. There is no passage for ships between the islands, but boats or small craft can pass through a narrow channel which is 100 to 200 yards from Hertford Island and between it and Middle Rock.

Hertford Island is 100 feet high. Hertford Ledge, which has 5 feet least water, extends from it nearly halfway across to Cape Dauphin, leaving a channel ½ mile wide and carrying 6 to 8 fathoms water. To avoid this ledge keep well over toward the cape, from which the shallow water extends ¼ mile.

Ciboux Island is 50 feet high, and from its outer point a reef runs 31° ½ mile, and Ciboux Shoal, with 15 feet least water, rock, on which the sea at times breaks heavily, lies 1,400 yards farther in the same direction.

Ciboux Island Light, fixed and flashing red, 77 feet above high water, visible 10 miles, is exhibited from a white octagonal tower, with a dwelling near it, ½ mile from the northeastern end of the island.

The coast of Cape Breton Island, from Cape Dauphin, trends southward 3 miles to Carey Point, the northwestern side of the entrance of Great Bras d'Or.

Carey Point is a shingle beach quite bold at its southern end. A shoal runs out 1,700 yards 40° from the point and forms the western side of the channel. On many parts of the shoal there is a depth of 3 feet at low water, so that there are breakers on it when there is any sea.

A red can buoy is moored on the northeastern end of the shoal extending northeastward from Carey Point.

A red spar buoy is moored on the eastern edge of Carey Point Shoal, 900 yards from the point.

Storm signals.—There is a storm signal station on Carey Beach.

Bar.—A wide bar commences immediately outside the shoal, and continues 1 mile northeastward, with irregular soundings of 3 to 6 fathoms, sand and gravel bottom. Middle Shoal, the shallowest part of this bar, has a depth of 18 feet over it, and lies 1½ miles 31° from Carey Point.

The coast, from Point Aconi, which is the northeastern end of Boularderie Island, trends westward 3 miles to Table Head.

Haddock Bank lies 1 to 1½ miles offshore midway between Point Aconi and Table Head, and has a least depth of 4 fathoms over it.

Table Head is a cliff, and Table Islet lies close off it; shallow water extends 300 yards from the islet. The coast trends southwestward, 1¾ miles from Table Head to Blackrock Point, of red cliffs.

Blackrock Shoal extends 400 yards northwestward from the point, and ½ mile northeastward.

A black buoy is moored on the northwestern side of Black Rock Shoal.

Noir Point, Boularderie Island, 1¼ miles southwestward of Black Rock Point, lies 340 yards 141° from Carey Point. The shoal water extend from about 100 to 250 yards off the coast between Noir and Black Rock Points.

A black spar buoy is moored on the edge of this shoal water.

Black Rock Point Light, a fixed white, 45 feet above high water, visible 12 miles, is exhibited from a square tower, 23 feet high, painted red, with a white cross, located on the point.

Noir Point light, fixed white, 41 feet above high water, visible 11 miles, is exhibited from a square white tower, 31 feet high, on Noir Point.

A fixed white light, 63 feet above high water, visible 13 miles, is exhibited from a square white tower, 46 feet high, 563 yards, 209°, from Noir Point lighthouse.

Great Bras d'Or is the western and principal of the two channels, on either side of Boularderie Island, leading to Bras d'Or Lake. Its entrance, between Carey Point and Noir Point, is deep; but a short distance outside, the channel is contracted by shoals to a width of 220 yards, measuring from the depth of 3 fathoms on either side. The least depth in the channel fairway is 29 feet. Eddy Rock, with 1 foot least water, lies within the entrance, off the small bight between Duffus and Mackenzie Points, on the southern side of the channel, and about 1,800 yards southwestward of Noir Point. Black Rock Point open northward of Noir Point leads northwestward of it. On the northern side of the channel, from Carey Point to Kelly Cove, a distance of 1 mile, the shore is quite bold.

There is good anchorage off the mouth of Kelly Cove, in 5 to 6 fathoms over a bottom of sand, and out of the strength of the tidal currents.

Kelly Cove is about ¾ mile wide at its mouth and ½ mile in depth, with a depth of about 20 to 24 feet water, mud bottom. It is sheltered from all except southwesterly winds, which do not cause much inconvenience, and it affords good anchorage. The depth of water is said to have been reduced by the careless discharge of ballast.

New Campbellton is at the head of Kelly Cove, and it is the shipping place of the Cape Breton Coal Mining Co., a large amount of coal being shipped annually. There is a telegraph office here.

Bras d'Or Settlement is on the eastern side of the channel near its entrance. A wharf has been constructed at Livingston Cove, on the western side of Boularderie Island, and opposite Kelley Cove. The wharf is 150 feet long, with a depth of 11 feet at its outer end at low water.

Buoyage.—The channel is marked by red buoys on the starboard hand, and black buoys on the port hand.

Directions.—The entrance channel of Great Bras d'Or being indirect as well as narrow, with rapid tidal currents, is very dangerous to attempt without local knowledge, except under favorable circumstances of weather, wind, and tide. When off Table Head, bring the two lighthouses at Noir Point in line, 210°, and keep this alinement, which leads between Middle Shoal and Carey Point Shoal to the westward, and Black Rock Shoal to the eastward, on until 800 yards from the front lighthouse, whence steer 230° through the narrows between Carey and Noir points, with Black Rock Point and Table Head in line astern; after which haul up for Kelly Cove. Should, however, the strong flood current carry a vessel above the cove, there is good anchorage 2 miles farther in on the same side, in 5 fathoms, and to the westward of Jane Point.

Tidal currents.—The tidal rise diminishes rapidly within the entrance. The usual velocity of the tidal currents in the entrance is 4 to 5 knots; but in the spring, or after long-continued northeasterly gales, which have previously raised the level of Bras d'Or Lake, it may amount to 6 knots. The currents form strong ripples and eddies, especially off Carey Point.

In fine settled weather the current runs out until half an hour before high water on the shore, and in until half an hour before low water, but strong winds cause great irregularities. Therefore, the current runs out nearly all the time the water is rising, and in nearly all the time it is falling.

Caution.—The tidal currents in the entrance of Great Bras d'Or do not set fairly through; the north or out-going current sets to the northward after passing Carey Point; the south or in-going current sets toward the eastern side of the channel.

Supplies.—There are houses and farms on either side of Great Bras d'Or Entrance, at which supplies of fresh provisions can be obtained. Water is easily procurable.

Point Aconi, the northeastern end of Boularderie Island, is formed of cliffs of the coal formation; a rocky shoal extends about ¾ mile from the point. The cliffs are fast yielding to the sea.

Point Aconi Whistle Buoy, black, marked "Point Aconi," is moored in 15 fathoms water 1¾ miles, about 46° from Point Aconi.

This buoy is withdrawn during the winter.

Bras d'Or, separating the coal-bearing strata of Boularderie Island and the country farther to the southeastward from the older rocks, marks a great change in the character of the coast. The mountainous coast to the northwestward gives place to land of moderate elevation, characterized by cliffs of sandstone and shale of the coal formation, until at older rocks on the southern shore of Mira Bay, and at Scatari Island, the latter being distant 36 miles from Bras d'Or.

Caution.—The shoals off this coast are such as to render caution necessary in fogs, when 30 fathoms, or at least 20 fathoms water, is as near as it should be approached, the latter depth being in some parts within 2 miles of the land.

Point Aconi Light, occulting white, 91 feet above high water, visible 15 miles, is exhibited from a square white tower, 20 feet high, with a dwelling attached, on High Cape, 1 mile southward of Point Aconi.

Shoals and foul ground of less than 5 fathoms extend about ¾ mile off the coast between Point Aconi and Little Bras d'Or Entrance.

Little Bras d'Or is the narrow and winding passage on the eastern side of Boularderie Island, which, at a distance of 5 miles within its entrance, expands into the wide and deep channel of St. Andrew.

The entrance, which is situated about ½ mile southward of High Cape Lighthouse, is only available for small craft and boats under favorable circumstances, as it is closed with breakers when there is a heavy sea running, and especially when the strong tidal current is running out against the wind. Dredging operations in the entrance channel during 1913 have provided a depth of 18 feet at low water for a width of about 80 feet from the deep-water midway between High Cape Lighthouse and Alder Point, over the bar to the entrance, 193°, a distance of 1,100 feet, followed by 1,300 feet in 179° 30′ direction. Inside the bar 17 feet at low water is available for a width of 80 feet for a further distance of 2,100 feet in 184° 30′ direction. It is intended to obtain a channel 120 feet wide and 20 feet deep at low water outside the entrance and 80 feet wide and 18 feet deep at low water inside the bar. There is a fishing establishment on the shingle point just within the entrance and scattered houses and farms at either side.

Tidal current.—The usual velocity of the current in the entrance is 4 knots.

There is a storm signal station on Alder Point.

The coast from Alder Point, the eastern point of Little Bras d'Or Entrance, trends southeastward 4¼ miles to Cranberry Head, the western entrance point of Sydney Harbor.

Caution.—From Point Aconi to Cranberry Head shoal water of less than 5 fathoms frequently extends nearly 1 mile offshore.

Bird Rock, 6 feet high, lies on the reef about 800 yards southeastward from Mope Head, and Bonar Rocks, dry at low water, at the same distance northeastward from Bonar Head. There is a rocky shoal with 4 feet least water nearly 1,200 yards to the northward of Lawler Point.

Cran Rock, with 16 feet water on it, lies 1,100 yards 36° from Cranberry Head, and there are soundings of 28 to 30 feet for 700 yards northeastward of the rock.

Cran Rock Light and Bell Buoy, red cylindrical, with superstructure, marked "Cran Rock," exhibiting an occulting red light, is moored in a depth of 7 fathoms 600 yards 65° from Cran Rock.

The high cliff of Mines Point open southeastward of Swivel Point leads southeastward of Cran Rock.

Storm signals.—There is a storm signal station on Cranberry Head.

Glare from steel works.—The glare of the steel works at Sydney may be seen at night from a distance of 40 miles northeastward of that harbor in clear weather; it has been mistaken for a vessel on fire.

Flat Point, the eastern entrance point of Sydney Harbor, bears 85°, distance about 3½ miles from Cranberry Head.

Flat Point Light, group flashing white, 75 feet above high water, visible 14 miles, is exhibited from an octagonal lighthouse, 69 feet high, painted red and white in vertical stripes, with a red lantern, on Flat Point.

A fog signal is made from the red roof of a square white building 60 feet above high water and near the shore close westward of Flat Point Lighthouse.

There is a marine signal and telegraph station at Flat Point.

Pilot stations for Sydney are at Flat Point Lighthouse and at Swivel Point. A rowing boat is used for boarding, and pilots do not board until the vessel is in the entrance between these points.

Flat Point Light and Whistle Buoy, painted black and white in vertical stripes, with a pyramidal superstructure marked "Sydney" in white letters and exhibiting an occulting white light, is moored in 19 fathoms on the alignment of the range lights and about 2½ miles northward of Flat Point Lighthouse.

Submarine bell buoy.—A black and white vertically striped cylindrical buoy, with pyramidal superstructure, and equipped with a submarine bell, is moored 200 yards southwestward from the light and whistle buoy.

Sydney Harbor is an inlet extending southwestward 5 miles from its entrance, with a general width of about 1½ miles; it then divides into West Arm, which continues southwestward for 3¾ miles to Ball Creek, with a general width of ¾ mile; and South Arm, which runs southward and southwestward for 5 miles, with a width decreasing from nearly 1 mile to 300 yards. The harbor is easy of access and egress, and capable of containing a large number of vessels of any size in safety. The navigable channel contracts to the breadth of ½ mile between the two bars, which extend from the shore on either side, 5 miles within Flat Point Lighthouse.

The town of Sydney Mines is on the northwestern shore of the harbor 1½ miles within Cranberry Head.

The town of North Sydney is situated on the northwestern side of the harbor 3½ miles within Cranberry Head, and the town of Sydney is situated on the eastern shore and 3½ miles within the entrance of South Arm.

Depths.—The depth in the harbor fairway is generally 9 to 6½ fathoms, the least depth of 6½ fathoms being situated on the leading line about 1 mile seaward of Southeast Bar.

North Sydney Roads comprise the water area from a line between Cranberry Head and Flat Point to the inner Northwest Bar and Southeast Bar buoys.

The port of North Sydney includes the water area within the bar buoys to the head of West Arm, its southeastern boundary being a line from Edward Point to Victoria Pier.

The port of Sydney comprises the water area of South Arm within a line from Edward Point to Victoria Pier southward to Sydney Bridge.

The northwestern shore of the harbor from Cranberry Head trends southward for about 1,200 yards to Swivel Point, when it turns southwestward. There is a depth of less than 5 fathoms for 1,000 to 600 yards off this shore as far in as Northwest Bar.

Wharf.—At Barrington Cove, midway between Swivel Point and North Sydney, a wharf, 894 feet long, extends to 12 feet at low water.

Northwest Bar, of sand and shingle, extends about 600 yards off the shore about 2½ miles within Swivel Point. The depth over a considerable part of the bar is from 6 inches to 2 feet at low water A breakwater runs out about 200 yards from the shore on its southwestern side, and with the bar affords some protection to vessels at North Sydney wharves and anchorage from east-northeasterly winds.

Northwest Bar Light Buoy, red, cylindrical, exhibiting an occulttween Cranberry Head and Flat Point to the inner Northwest Bar

A red conical buoy is moored on the northeastern point of Northwest Bar.

Ballast ground.—Nearly all vessels calling for coal at North Sydney arrive in ballast, which is discharged on the ballast ground southwestward of the wharves. This ground, now partly dry, extends about 300 yards into the harbor and shelters the wharves from the southwestward.

The southern shore from Flat Point takes a southwesterly direction for 4½ miles to Daly Point, and shoal water of less than 5 fathoms extends generally about 900 yards off it.

Petrie Reef, parts of which nearly dry, extends 650 yards offshore 1¼ miles southwestward of Flat Point.

A black can buoy is moored off the northwestern end of Petrie Reef.

Livingstone Shoal, with 4 feet water, extends ¼ mile offshore about 2 miles southwestward of Flat Point.

A black can buoy is moored off Livingstone Shoal.

Southeast Bar.—A narrow bar above water extends southwestward ¾ mile from Daly Point, and it is continued ¼ mile northwestward by a bank of sand and shingle, which covers. Shoal water of less than 3 fathoms extends ¼ mile northward of the bar above water.

Southeast Bar Light, fixed red, 39 feet above high water, visible 7 miles, is exhibited from a red lantern, rising from the roof of a white square dwelling, on a gray pier on the western extremity of Southeast Bar.

A fog signal is made from the lighthouse.

A black can buoy is moored about 400 yards 219° from the lighthouse.

Sydney Range Lights.—A revolving white light, 59 feet above high water, visible 3 miles, is exhibited from an octagonal white tower, with a red lantern, 53 feet high, on the southeastern side of West Arm about 1 mile southwestward of Edward Point.

A fixed white light 120 feet above high water, visible 17 miles, is exhibited from a square white tower, 38 feet high, situated ½ mile 214° from the preceding lighthouse.

The lights in line lead into the harbor, and between Northwest and Southeast bars.

Battery Point Range Lights.—The front light, fixed red, visible 4 miles is shown from an electric lantern on a white pole surmounted by a triangular topmark, 26 feet high, on the outer end of railway jetty at Battery Point, Sydney.

The rear light is shown from a similar lantern and pole with inverted triangular topmark, on the shore, 377 yards 167° from the front light.

These lights in line lead up the South Arm from abreast of Southeast Bar.

Prohibited anchorage.—Anchorage in the port of North Sydney is prohibited, but small vessels only may anchor in West Arm above a line joining Allen Point and Sydney Front Light. All other vessels are to anchor eastward of a line drawn 181° from Southeast Bar Light. Vessels will be allowed to proceed alongside the North Sydney wharves.

Anchorage may be obtained in Fishery Cove in 6 to 7 fathoms mud, well sheltered by Southeast Bar.

The port of Sydney, being completely sheltered by Southeast Bar, affords safe anchorage in every part. The anchorage is good, with deep water close off the wharves of the town northward of the line of Shingle Point bearing 245°; within that line there are shoals. The depth of this anchorage is 5 to 8½ fathoms mud. There is sufficient depth for large vessels to the head of the harbor, between which and the town is the most secure part.

Ice.—The harbor is usually frozen over between January 16 and February 28, closing navigation.

Directions.—From the northward, when approaching Sydney Harbor, while well seaward of the entrance, bring the range lighthouses in line 214°, which mark leads into the harbor, and between Northwest and Southeast bars. If bound for the port of North Sydney, when Jackson and Allen points (two shingle points on the northern shore of West Arm) are in line; or Flat Point Lighthouse is in line with Petrie Point, keep either of these marks on, which lead southeastward of Northwest Bar until the Roman Catholic Church spire at North Sydney bears 313°; then haul in.

For Fishery Cove keep the leading lighthouses in line until abreast Southeast Bar Lighthouse, when steer 167° on the line of South Arm lighted leading beacons on Battery Point and haul in for the anchorage when the ruins of Victoria Pier bear 90°.

For the port of Sydney, proceed as above, and continue on the line of lighted leading beacons on Battery Point, up South Arm to the Intercolonial Railway Wharf. To reach the anchorage in front of the town a course of 182° should be steered when the Dominion Iron and Steel Co.'s wharves are abeam, and altered to 148° when the rear light beacon is abeam.

Black buoys are left on the port hand entering, and red buoys on the starboard hand.

From the eastward round Flat Point Lighthouse at a distance of not less than 1,200 yards, or in a depth of not less than 7 fathoms water, and do not haul to the southward of 235° until on the line of leading lighthouses, observing that the 5-fathom curve extends nearly ½ mile from the shore past Petrie Reef and Livingstone Shoal. When about 1,600 yards off Petrie Point, the lighthouses are in line; keep this mark on and proceed as above directed.

In beating into this harbor care is necessary, especially when between Northwest and Southeast bars, both of which are so steep that the lead affords little or no warning. There is, however, plenty of room for even the largest ship.

Tides.—The high water interval at Southeast Bar is 8h. 06m., mean range 4.1 feet, spring range 5 feet. The ordinary velocity of the currents is ½ knot off the town, but much weaker farther out in the wider parts of the harbor.

North Sydney Town has a considerable coal trade, the mine being situated near Cranberry Head. This, the Old Sydney Mine, is the most extensively worked mine in the island. The population of the town of Sydney Mines was 7,470, and that of North Sydney 5,418 in 1911.

Radio station.—There is a radio station at North Sydney, open day and night; the call letters are V C O.

Storm signals are exhibited at North Sydney.

Wharves.—The intercolonial Railway pier has a depth of 26 feet alongside the outer end, decreasing to 20 feet at the inner end.

The two coal piers eastward of the railway pier are 900 feet and 650 feet long, respectively, with depths alongside of 28 and 26 feet at low water.

The breakwater is about 1,500 feet long, with a depth of 16 feet at low water for a length of 300 feet.

There are three other wharves, each about 400 feet long, and having depths of 16 feet alongside.

Patent slips.—There are two patent slips capable of taking vessels of 250 tons at North Sydney.

Repairs.—There are well-equipped steam forge works at North Sydney for effecting such repairs to hull or machinery of iron vessels as do not require a dry dock.

Supplies.—All kinds of supplies are kept in stock. Water is supplied from waterworks belonging to the municipality; there is also a convenient watering place at the creek, a short distance westward of the town.

Coal.—The best local bituminous coal can be supplied in any quantity. The Dominion Coal Co. can ship 10,000 tons a day; the Nova Scotia Steel & Coal Co. can also ship 10,000 tons a day. Coal is shipped at the wharves, alongside which vessels can lie at any time when the harbor is open, but strong easterly winds impede or prevent coaling.

Hospital.—Sick seamen are cared for at the Hamilton Hospital, North Sydney.

Sydney Town, on the summit of a peninsula 55 feet high, contains many fine buildings, among which are seven churches, a courthouse, an academy, and a postoffice. It is developing very rapidly, and is extending toward the bridge to the southward, and along the shores of South Arm to the northward. It occupies a site in the best sheltered part of the harbor, where a considerable number of vessels could lie in security, and has a productive country, rich in coal and iron, behind it. It is the shipping place for several coal mines. The Dominion Iron & Steel Co. have built extensive works for the manufacture of iron and steel along the eastern side of Wintering Cove, which is northward of the peninsula on which the town of Sydney stands. The chimneys of the blast furnaces of these works are most conspicuous in approaching the harbor.

The population of Sydney was 17,723 in 1911.

A steam ferry runs between Sydney and North Sydney.

Weather.—The spring is late, the advance of summer being retarded by the cold winds from the sea, which is usually, until late in May, filled with drift ice, large masses of which are frequently driven into the harbor by northeasterly winds.

Storm signals are exhibited at Sydney.

Wharves.—On the northern side of Wintering Cove the Dominion Coal Co. has two piers, known as the International Piers No. 1 and No. 2. They are 1,120 and 1,150 feet long, respectively, carry railway tracks, and are equipped with modern appliances for loading and unloading vessels. Four steamers can be berthed and loaded at one time, and the loading berth at No. 1 pier has 26 feet of water at low water.

Close northward of these piers, the Dominion Steel Co. also has two piers. No. 1, from which steel rails, etc., are shipped, has ample length and water to accommodate a steamer of 10,000 tons; while at No. 2 pier a vessel of 7,000 tons can be discharged in 10 to 11 hours.

These piers are all connected to the Intercolonial, and Sydney and Louisburg railways.

There are several smaller wharves, with considerable warehouse accommodation along the water front of the town.

Buoy.—A buoy, marked "Danger," is moored about 600 yards to northward of these railway wharves, and 300 yards offshore, marking an obstruction consisting of a pile of stones about 40 feet square, over which there is only 2 feet at low water springs.

Supplies.—Meat, vegetables, and bread are plentiful and good, and supplies of every kind may be readily obtained.

Good water can be obtained at the water mains on the wharves, also by a steam water tank, or on the eastern side of South Arm, also, opposite the town of Sydney, and in several other places where brooks enter the sea.

Repairs.—There are good facilities for repairs at Sydney, but no dock.

Hospital.—A marine hospital is maintained at Sydney.

Quarantine.—The quarantine hospital is situated on the shore of South Arm, about ¼ mile within Edward Point, and near Keating Point; the quarantine wharf extends 148 feet into 8 feet at low water. There are special regulations for vessels from West Indian ports obtaining pratique.

Communication.—Lines of steamers run between North Sydney and Sydney and Quebec and Montreal, Halifax, Boston, and St. Johns, Newfoundland. A steamer runs three times a week between North Sydney, on arrival of the Intercolonial train, and Port Basque, Newfoundland, connecting with the Newfoundland Railroad.

A steamer runs twice a week to South Arm of St. Ann Harbor and the ports on the coast northeastward of that harbor. Steamers of the

Bras d'Or Steam Navigation Co. ply daily during the season to and from Whycocomagh and the ports in Bras d'Or Lakes.

There is telegraphic communication both at North Sydney and Sydney.

Telegraph cables.—Cables run from North Sydney, thus: Two to Placentia, one to St. Pierre, one to Canso.

South Arm, above Sydney Bridge, is navigable to Forks Bridge, about 4 miles above the town, where the tide ends. A road from Sydney leads over Forks Bridge to East Bay of Bras d'Or.

The coast from Flat Point trends eastward for 4 miles to Coal Point.

Davis Head Shoal lies 1,600 yards 327° from Coal Point; it is of small extent, with a least depth of 12 feet water over it, and there is deeper water between the rock and the land.

As far as an examination made in 1898 showed, this is the outside shoal, but Coal Point and also the other points in this locality should not be closed to a distance of less than 1 mile.

Indian Bay, southward of Coal Point, is 3 miles wide and 1½ fathoms deep. It is open to easterly wind and swell and affords safe anchorage only in offshore winds and fine weather. At its head a dry sand bar 1 mile long extends across from the eastern to within 150 yards of the western shore, leaving an entrance of that breadth into Bridgeport Harbor, which is a shallow pond extending 2 miles inland. The depth of 8 feet at low water can be carried into this harbor, the interior of which is occupied by flats of sand and weeds, partly dry at low tide, except in a narrow and winding channel, having 7 to 15 feet in it, and which leads into a wide expansion, carrying 8 feet at low water.

The entrance into the harbor is crossed by a bridge, built for the accommodation of traffic, over the beach, between Lingan, on the western side, and Bridgeport, on the eastern side of Indian Bay.

Lingan Head Light, fixed red, 50 feet above high water, visible 8 miles is exhibited from a white tower, at the northern side of Bridgeport Harbor entrance.

Anchorage.—The best anchorage is near the middle of the bay, and in a depth of 5 fathoms or less; in greater depths the bottom is generally rocky, and not to be trusted.

Directions.—In entering Indian Bay, give its points, which are cliffs of the coal formation, a berth of over ½ mile, not closing them to a depth of less than 5 fathoms; shallow water extends to the same distance from the north shore and head of the bay, as well as eastward toward Table Head.

Tidal currents.—The ordinary velocity of the tidal current in the entrance is 2 knots.

Glace Bay, 5 miles farther southeastward, affords no safe anchorage. At its head is Dyson Pond, extending 2 miles inland, and with a narrow outlet through sandhills and sandbeach which is usually dry at low water. On the northwestern side of this bay, at Glace Cove (Little Glace Bay), shallow water extends ¾ mile off-shore, and on the opposite side, at Macrea and Whelan Points, reefs run out fully ½ mile from the cliffs.

The population of the town of Glace Bay was 16,562, in 1911.

Storm signals are exhibited from the north side of Glace Cove, close to the entrance.

Glace Bay Range Lights.—The front light formerly shown on the north pierhead, at the entrance to Glace Cove, has been destroyed. It is to be rebuilt on the land.

The rear light, fixed red, visible 8 miles, is shown, 51 feet above high water, from a white square tower, 42 feet high, erected on the coast 640 yards 216° from the site of the former front light.

Owing to ballast from the piers at the entrance to Glace Cove being washed into the channel by a gale, the depths between the piers have been reduced to 5 or 6 feet. Vessels should not enter without local knowledge.

Glace Bay Bell Buoy.—An iron buoy, painted in black and white vertical stripes, surmounted by a bell, and marked "Glace Bay," is moored in 7 fathoms, in the former alignment of the leading lights about 2,900 yards distant from the rear lighthouse.

Harbor regulations.—At the port of Little Glace Bay vessels immediately on arriving in the harbor shall have both anchors hanging at the hawse pipes, and shall have the yards braced up.

Cape Percy, 3 miles eastward of Macrea Point, is a precipitous headland, where the cliffs of coal-bearing sandstone rise 110 feet above the sea. Schooner Rock, with 5 feet least water, is the shallowest part of a reef which extends 800 yards from the northern side of the cape.

Percy Rock, with 7 feet water, lies 400 yards off the northeastern part of the cape.

Flint Island, lying about 1½ miles 76° from the southeastern point of Cape Percy, is sandstone, broken, precipitous, 60 feet high, and 600 yards long in an easterly direction. Boats can land only on its northern point, where there is a fish store. Shallow water does not extend more than 800 yards from it in any direction, but within 800 yards of its western end there are very uneven soundings, varying from 4½ to 12 fathoms in a cast of the lead, which cause, with the tidal current, a strong rippling, and at times a heavy breaking sea.

Between this uneven ground and the cape there is a clear channel 1 mile in breadth, through which an irregular tidal current runs at times with a velocity of 2 knots.

Flint Island Light, group flashing, visible 14 miles, is shown, 74 feet above high water, from a white concrete tower, 62 feet high, with red lantern and detached dwelling, on the northeastern end of Flint Island.

A fog signal is made from a white square building with red roof, situated close eastward of the lighthouse.

Fog.—There is said to be frequently clear weather to the northward of Flint Island when there is fog to the southward of it. The southwesterly wind which is accompanied by dense fog at Scatari becomes clear during its passage over the warm land.

Morien Bay.—Cape Morien bears about 163°, distant 2½ miles, from Cape Percy, and Morien Bay extends southwestward about 4¾ miles from its entrance between these capes. On the northern side of the bay, and just within Cape Percy, lies Cow Reef, dry in part at low water, and extending ½ mile from the shore. The head of the bay is occupied by flats of sand and mud, partly dry at low water, through which a narrow and shallow channel leads to False Bay Beach, on the northern side of Mira Bay.

Morien Bay does not afford safe anchorage, as it is completely open to easterly winds.

Cow Reef Bell Buoy, red, marked "Cow Reef," is moored in a depth of 8 fathoms 400 yards 133° from the end of Cow Reef.

Port Morien.—A breakwater, originally 1,374 feet in length, extends from the northwestern shore of the bay near Arnold Point, about 4 miles southwestward of Cape Percy. The area of the basin inclosed between it and the shipping pier of the Gowrie coal mines, now the property of the Dominion Coal Co., was 17 acres, 10 acres of which had a depth of 9 to 17 feet at low water. In 1895-6 the outer and upper part of the breakwater, for a length of 260 feet, was carried away by the sea; repairs have been executed on the remaining 1,120 feet, which continues to be maintained.

Port Morien Light, fixed white, visible 10 miles, is exhibited 26 feet above high water from a pole with shed at base, on the public wharf at Port Morien.

Ice.—Morien Bay rarely freezes over; drift ice arrives about the middle of February, and usually disappears about May 1, the bay being only closed at intervals by field ice.

Cape Morien is a bold headland, its sandstone cliffs, which abound in coal, rising on its southern side 150 feet above the sea. Shoal water extends 300 yards off it. It is the northeastern end of a peninsula, which forms the precipitous northern shore of Mira Bay for a distance of 5 miles and terminates at the shingle isthmus of False Bay Beach.

Mira Bay stretches in 9 miles southwestward of Cape Morien and is 7¼ miles wide at its entrance between that cape and Moque Head.

Being open to the eastward it affords no safe anchorage. Mira River, after flowing for several miles between precipitous banks, enters the head of the bay between points of sand and shingle, 80 yards apart. It discharges the waters of Mira Lake and Salmon River, and is the outlet of an interior navigation of about 20 miles; the ordinary depth on its bar of sand and stones is only 4 feet at low water, and seldom exceeds 8 feet, except in extraordinary spring tides.

Catalogue Lake has only 1 foot at low water in its very narrow outlet, through a sand and shingle beach 2 miles southward of Mira River. It is broken into coves, peninsulas, and islets forming picturesque scenery. There is a church at its head 3 miles in from the entrance, and its shores are occupied by farmers and fishermen.

Mira Bay, and probably the valley of its river and lake, define a remarkable change in the character of the coast and nature of the country. Instead of the undulating and comparatively fertile land and the long ranges of sandstone cliffs, abounding in coal, which form the northern side of the bay, the country to the southward, including Scatari Island, is all hummocky land, in which small round or conical hills rise from among swamps, shallow ponds, and dwarf spruce trees.

The slates, sandstones, and conglomerates of this country appear to be subordinate to the coal formation. They are greatly shattered and frequently altered by the abounding trap rocks, and the only parts that appear susceptible of cultivation are isolated hills of drift sand, clay, and bowlders.

Mainadieu Passage is about 1 mile wide between Moque Head and West Point, Scatari Island, with a clear deep-water channel, 700 yards wide in its narrowest part, which is between Great and Little Shag Rocks, in the northern part of the entrance. It should only be used in such wind and weather as would insure not being caught by the prevailing dense fog, the channel being rendered indirect by numerous shoals, with no good holding ground, and in which there is no shelter from the heavy sea which accompanies all easterly and southerly winds.

Great Shag Rock, 800 yards northeastward of Moque Head, is black, 60 yards long, and 15 feet high. Shag Shoal, with depths of 15 to 26 feet, rock bottom, extends from it 800 yards northeastward and nearly 400 yards eastward, in which latter direction there is a patch with 12 feet least water on the extreme edge of the shoal.

Little Shag Rock and West Point of Scatari in line lead eastward of Shag Shoal.

Little Shag Rock, 300 yards northwestward of West Point, Scatari Island, is 6 feet high, and Cary Rock, 150 yards off the north coast of Scatari, 900 yards farther eastward, is 3 feet high. Both are small black trap rocks. Shoal water does not extend beyond 100 yards outside Little Shag Rock, leaving a clear channel 700 yards wide and with 9 fathoms water between it and Shag Shoal.

Neering Rock.—Mainadieu Passage, westward of Great Shag, is rendered dangerous by Neering Rock, which, with 9 feet least water, lies 700 yards 304° from Great Shag Rock.

Duck Rock, awash at high water, lies 400 yards southeastward from Moque Head.

Mad Dick Rock, with 3 feet least water, lies 665 yards 184° from Moque Head.

Mad Dick Rock Bell Buoy, red, is moored, in 6 fathoms, on the south side of Mad Dick Rock.

Black Rock, 10 feet high, lies 1,600 yards 192° from Moque Head. There are other rocks in the mouth of Mainadieu Bay, but they are not in the way of general navigation.

Bar Reef, which runs out from Bar Point, on the southern side of Mainadieu Bay, more than halfway across to Scatari Island, was formerly a dry bar covered with sand and grass; the only part now uncovered at high water is Barstone, a rock about 4 feet high, but at low water the reef still dries extensively and completely shelters Mainadieu Bay from southerly wind and swell. Barstone lies ¾ mile offshore, and the reef continues ¼ mile farther toward West Point of Scatari, which it approaches to within ¾ mile, and then turns southeastward. The reef continues in this direction ¾ mile and terminates at Helen Rocks, which are covered by 4 and 6 feet at low water, and the sea often breaks heavily on them. The eastern end of this reef, in 5 fathoms, lies 1¼ miles 167° from West Point of Scatari and 2 miles 358° from Cape Breton.

Bar Reef Whistle Buoy, black, marked "Bar Reef," is moored in a depth of 12 fathoms about 600 yards 87° from Helen Rock.

The eastern part of Portnova Island open eastward of Cape Breton leads eastward of Bar Reef.

The reefs off the southwestern side of Scatari Island are above water; Hatch Rocks extend 500 yards offshore at 1,800 yards southeastward of West Point, and Ragged Rocks extend 400 yards southwestward of Tin Cove Head, 1½ miles farther eastward.

Shag Rock open southwestward of West Point of Scatari leads southwestward of Hatch Rocks.

Mainadieu Light, occulting white, visible 15 miles, is shown 90 feet above high water, from a square white lighthouse, 40 feet high, with a dwelling attached, on the southern side of West Point, Scatari Island.

The light station is connected by telephone with the light station on the northeast point of Scatari Island.

A fog signal at this station answers signals from vessels.

Mainadieu Harbor, on the northern side of Mainadieu Bay, ¾ mile within Moque Head, is a semicircular cove about 400 yards across, with a depth of 10 to 14 feet, sand. A breakwater extends 230 feet from the eastern side of the harbor. A breakwater, built on the western side of the harbor, extending 230 feet, has had the effect of sheltering a portion of the foreshore only, and of rendering the anchorage less safe than it was before. The harbor is sufficiently sheltered by the reefs and Scatari Island to afford safe anchorage to coasting and fishing vessels drawing less than 10 feet water, but larger vessels would be endangered by the swell which accompanies easterly gales, and would cause them to strike the ground at low water.

The approach to the harbor, between numerous rocks, above and under water, is difficult and dangerous; Harbor Rock, with 3 feet over it, lies in the middle of the entrance, and it is not advisable to attempt to enter the harbor without local knowledge, or the assistance of a fisherman of the place.

The shingle beach of the harbor is occupied by fish stages, and its shores by a village of fishermen and small traders, which has two chapels. There is a telegraph office here.

Tides.—The high water interval at Mainadieu is 8h.; mean range 4.5 feet, spring range 5.5 feet.

Directions.—**Mainadieu Passage** may be taken by vessels of any size, without danger, but only under favorable circumstances of wind and weather. All southerly and easterly winds are unfavorable, because they are either accompanied by or conducive to the sudden formation of dense fogs. Winds between west and north are as constantly free from fogs, and being, moreover, smooth-water winds, are favorable for this passage.

From the northward, on approaching the passage, bring Little Shag Rock in line with West Point of Scatari; keep this mark on until Shag Rock and Moque Head are in line, when the eastern end of Shag Shoal is passed; then round West Point of Scatari at the distance of about 600 yards and steer 122° until Portnova Island opens eastward of Cape Breton.

From the southward, pass Portnova Island and Cape Breton at the distance of ½ mile or more, and steer for Steering Hummock Hill, which rises to the height of 150 feet 1,200 yards eastward of West Point of Scatari. Do not shut Portnova Island in behind Cape Breton until past Bar Reef. When West Point of Scatari bears 324° steer so as to round it at a distance of about 600 yards, and pass between Little Shag Rock and Shag Shoal. When Little Shag Rock is in line with West Point of Scatari shape a course for Cape Morien.

Tidal currents.—The ordinary velocity of the tidal currents in Mainadieu Passage is 1 to 2 knots, the flood being the north-going current and the ebb the south-going, but they are often very irregular.

Scatari Island, West Point of which lies about 1 mile 101° from Moque Head, is triangular in shape; its northern and longest side is 5½ miles in length, and a line at right angles to it, terminating at Howe Point, the southern end of the island, is 2½ miles in length.

The natural features of this island are similar to those of the adjacent mainland, the highest hill rising 190 feet above the sea. It is not permanently inhabited, being reserved by the Government, but it is much frequented by fishermen in summer.

The reefs on the northern coast of the island extend less than 400 yards off it. Northwest Cove, near the middle of its northern side, affords a smooth water anchorage in southerly winds, but the holding ground is not good, and vessels must weigh immediately the wind shifts to seaward.

Scatari Island Light, group flashing, visible 15 miles, is shown, 90 feet above high water, from an octagonal white lighthouse with a red lantern, 70 feet high, about 150 yards westward from the eastern end of the trap rock which forms the northeastern point of Scatari Island.

The light station is connected by telephone with the light station at West Point of the island.

A fog signal is made from near the lighthouse.

A lifeboat is maintained near the lighthouse.

Cormandiere Rocks, nearly ¾ mile northeastward of the lighthouse, are small black trap rocks from 6 to 16 feet high and bold to seaward; there is no passage between them and the lighthouse for ships.

Eastern Harbor, southward of the long narrow eastern point of Scatari Island and between it and Hay Island, which lies about 1,200 yards southwestward of the lighthouse, is merely a very insecure anchorage within reefs; it is used occasionally by small vessels employed in the fisheries in fine summer weather.

Reefs.—A reef runs eastward ½ mile from Hay Island; outside this, and bearing 158°, distant 2,300 yards, from the lighthouse, lies Wattie Rock, with 4 fathoms on it at low water; still farther out, 1¼ and 1½ miles, respectively, 152°, from the lighthouse, there are two rocky patches, with 5 fathoms water over them, on which the sea occasionally breaks.

The southeastern and southern coasts of the island are broken by the heavy and almost incessant swell into rocky points and coves, which afford excellent fishing stations, but no shelter to shipping.

Cape Breton, the extreme eastern point of Cape Breton Island, is about 2¼ miles southeastward from Bar Point. It is low, rocky, covered with grassy moors, and bold to the eastward, with the exception of a rocky 12-foot patch, ¼ mile 128° from it. Lansecoin Island lies in the mouth of a shallow bay, 1,400 yards northward of the cape; it is about 400 yards across, 50 feet high, and bold to seaward, but a reef, with a rock, dry at low water, near its end, extends 300 yards, 145°, from the island.

Portnova Island lies ¾ mile 187° from Cape Breton. It is rocky and precipitous, 300 yards across, and 50 feet high. Chameau Rock, awash, and surrounded by shoal water, lies nearly midway between Portnova and the cape, leaving no passage for ships. A rock, with 12 feet water, lies 650 yards southwestward of Portnova.

Southeast coast.—The land from Cape Breton to Cape Gabarus, which bears 236°, distant 15 miles, is of moderate height, and the coast is broken into coves and small harbors, with some hummocks, about 200 feet high, in the background. The northern shore of Gabarus Bay is steep, the hills rising 200 feet abruptly from the sea; on its southern shore the land is much lower.

The land from Cape Gabarus to Michaux Point, which bears 239°, distant 30 miles, is low, and has a barren and rocky appearance, and the coast is broken into numerous lakes and ponds, protected from the sea by beaches of gravel and some small rocky islands and ledges. Occasionally there are reddish clay cliffs, 70 to 90 feet high, but at a distance from the land there are no easily recognized features.

The prevailing rocks are clay-slate and trap, with overlying hills of drift-clay and bowlders. Much of the land is poor and swampy, but the hills of drift clay repay cultivation; the coasts are thinly settled by a hardy and industrious people, whose houses are on the shores of the bays and coves most convenient to the fishing ground.

The only safe harbor on this coast is Louisburg.

Soundings.—The 50-fathom curve from about 32 miles eastward of Cape Breton, takes an irregular westerly direction to about 2 miles southward of Michaux Point. Curdo Bank, with a depth of 10 fathoms over it, and about 30 fathoms around, is of small extent, and lies 8½ miles, 115°, from Cape Breton. There is also a small 17-fathom patch, with 24 to 30 fathoms around, 6½ miles eastward from Cape Gabarus. South-westward of Cape Gabarus the 30-fathom curve is distant 3 to 4 miles from the land, but the bank of soundings contracts off St. Esprit Island, and 2 miles from it the depth is 40 to 50 fathoms. The lead should be constantly used in foggy weather, and no part of this coast approached to a less depth than 40 fathoms,

Current.—About 3 miles off this coast a current is often experienced running west-southwestward nearly 1 mile an hour; it is not so frequent nearer the shore.

The coast from Cape Breton trends 7½ miles westward to Lighthouse Point, the northeastern entrance point of Louisburg Harbor. Baleine Cove, 2 miles, to Little Lorembec, 2¾ miles, and Lorembec, 5½ miles, westward of Cape Breton, and three small harbors, too intricate and rocky in their entrances to admit vessels of any size, but affording excellent fishing stations. There is a bar at the entrance of Lorembec with a least depth over it of 1¼ feet at low water. A channel 820 feet long and 40 feet wide has been dredged to a depth of 8½ feet at low water across the bar.

Baleine Cove Bell Buoy, red, marked "Baleine," is moored in a depth of 15 fathoms, at the entrance to Baleine Cove, ¼ mile, 223° from rock on eastern side of the entrance.

Little Lorembec Light, fixed white, visible 9 miles, is shown, 76 feet above high water, from an octagonal white lighthouse with a red lantern, 32 feet high, on Black Head, the western headland at the entrance of Little Lorembec Harbor.

Louisburg Light and Whistle Buoy, red, moored in 36 fathoms 3 miles, 128°, from Lighthouse Point, shows a light.

Submarine bell buoy.—A red cylindrical buoy, surmounted by a pyramidal frame with bell-shaped topmark, and having dependent from it a submarine bell, is moored about 170 yards northwestward of the light and whistle buoy.

Wild Cove Shoal, with 8 feet water over it, lies about ½ mile off-shore ½ mile eastward of the eastern entrance point of Lorembec Harbor.

White Rock, with 18 feet water over it, lies about 1,400 yards 138° from the western entrance point of Lorembec Harbor.

Lighthouse Point and Loran Head in line 247° true, leads close southward of White Rock.

Lorembec Rock, with 9 feet water over it, lies 400 yards 133° from Lorembec Head, which is a rocky Bluff, 61 feet high, situated 1½ miles eastward of Lighthouse Point.

Lighthouse Point is the southeastern point of a headland on the western side of which is Northeast Arm of Louisburg Harbor. Its face is cliffs, 25 feet high, the land rising within it to Stony Hills 111 feet high.

Louisburg Harbor Light, fixed and flashing, visible 16 miles, is shown 85 feet above high water, from a dwelling, painted white with a black vertical stripe, and a lantern on the roof, 35 feet high, 120 yards within Lighthouse Point, northern side of the entrance, A fog signal is made from a small white house, at 50 feet above high water, and on the summit of a small knoll situated on the edge of the cliff 130 yards 95° from the lighthouse.

Shoal.—Shoal water extends 100 yards off Lighthouse Point, and there is a depth of 25 feet nearly 300 yards southward of the point.

Rochford Point lies 1,800 yards 216° from the lighthouse on Lighthouse Point.

Battery Island, 26 feet high, lies about 700 yards northeastward of Rochford Point, and at low water it is so nearly joined by a rocky ledge to the point as to leave only a boat passage. Shoal water of less than 5 fathoms extends northward of this ledge to a position 800 yards 352° from Rochford Point.

Rocky Island, 8 feet high, lies 300 yards eastward of Battery Island. Shoal water extends 150 yards northward of Battery Island, and 200 yards northward of Rocky Island; a reef also extends 200 yards eastward of Rocky Island.

A black spar buoy is moored in 5 fathoms at the extremity of the reef extending eastward from the island.

Green Island, 41 feet high, lies 300 yards south-southwestward of Rocky Island; it is bordered by rocks for about 300 yards off it.

The whole space within these islands and between them and Rochford Point is shallow and rocky.

Harbor Shoal.—Two small patches of 21 and 25 feet water lie 750 yards eastward of Rocky Island; the sea breaks on them in very heavy weather. There are depths of less than 10 fathoms for about 150 yards around these patches.

Louisburg Bell Buoy, black, is moored 450 yards 82° from the 21-feet patch of Harbor Shoal, and 1,335 yards 127° from the lighthouse on Lighthouse Point. This buoy is replaced in winter by a black spar buoy.

A spar buoy, painted red and black in horizontal bands, is moored close westward of the 21-feet patch of Harbor Shoal.

Whistle and bell buoys.—Caution.—Mariners are cautioned that the spar buoys, which, in winter, replace the whistle and bell buoys in Louisburg Harbor approach, must not be relied on, as they may be moved out of position by drift ice, and their situations are very exposed.

Louisburg Harbor.—The entrance of Louisburg Harbor lies between Lighthouse Point and Rocky and Battery Islands; it is about 750 yards wide, but the navigable channel between the shoals extending off each side is 400 yards wide. Within the entrance Southwest Arm continues southwestward for about 1¼ miles, with a general width of about ½ mile, while Northeast Arm, in which is the usual anchorage and on the northwestern shore of which is Louisburg Town, turns northward within Lighthouse Point promontory for about 1 mile, with a general width of 600 to 800 yards.

Depths.—In Northeast Arm anchorage and the vicinity of wharf heads the depths are 30 to 36 feet. In the harbor fairway the least depth on leading marks is from 36 to 42 feet between Battery and Russell Point Shoals; outside this the depths on leading marks range from 7 to 10½ fathoms.

Shoal.—From 100 yards off Lighthouse Point the 3-fathom curve takes a westerly direction for nearly ½ mile, and passes about 50 yards southwestward of Nag Rock; it then turns northwestward to a position 300 yards westward of Russell Point, when it forms a bight and passes Careening Point at the distance of a little more than 100 yards. Within this curve the ground is foul in places.

Nag Rock, 800 yards 263° from the lighthouse on Lighthouse Point, has a depth of 2 feet water over it.

A bank, about 100 yards in width, with depths of 23 to 30 feet over it, extends ¼ mile southwestward from Nag Rock.

A red buoy, with a conical topmark, is moored in 22 feet at about 60 yards southward of Nag Rock.

A red conical buoy, moored in a depth of about 7 fathoms, marks the southwestern extremity of the bank extending from Nag Rock.

A black can buoy marks the northern extremity of the 5-fathom curve northward of Rochford Point.

Battery Shoal.—Battery Point is situated on the western shore of the harbor about ½ mile westward from Russell Point, and Battery Shoal extends about 600 yards in an easterly direction, with a width of 300 yards, from the vicinity of Battery Point. Outside, a distance of 200 yards from the shore, this shoal has general depths of 21 to 27 feet water over it, but near its southeastern part there is a shoal patch of 16 to 19 feet water.

A black can buoy is moored, in about 5 fathoms, southeastward of the 16 to 19 feet patch about 100 yards westward of the leading line of coal wharf lights.

A black buoy is moored in 21 feet on the eastern part of Battery Shoal, about 150 yards northward of the above, and about 50 yards inside the 5-fathom curve inclosing the shoal.

The deep channel between this shoal and the shoal off Russell Point is 150 yards wide.

A red buoy, with a spherical topmark, is moored on the edge of the shoal ground lying off Russell Point.

All the can and conical buoys in Louisburg Harbor are replaced by spar buoys in winter.

Louisburg Range Lights.—The front light, fixed red, visible 7 miles, is shown, 26 feet above high water, from a square white building, 28 feet high, situated on a low gravelly point on the northwestern shore of Southwest Arm.

The rear light, fixed red, visible 7 miles, is shown, 54 feet above high water, from a similar building, situated 443 yards, 268° from the preceding lighthouse. The alignment of these lights leads from sea into Southwest Arm, in a least depth of 45 feet.

Coal Wharves Range Lights.—The front light fixed red, visible 5 miles, is shown from a lamp on a white pole on the outer end of the eastern long coal wharf at Louisburg.

The rear light, fixed red, visible 5 miles, is shown 85 feet above high water from a lamp on a white pole situated about 200 yards inland, 687 yards 9° from the preceding lamp pole.

These last two lights are maintained by the Dominion Coal Co., and their alignment leads, from its intersection with that of the Louisburg Range Lights on the northwestern shore of South Arm, through the deep-water channel to the coal wharves.

Pilots.—There is a properly certified staff of pilots at the port, and the pilot schooner cruises outside the harbor. The pilot station is on Battery Island.

Pilotage charges are moderate, but winter pilotage is 50 per cent additional to summer rates.

Ice.—Northeast Arm freezes over about January 15, but the ice breaks up at any time with southerly winds, and navigation in this port never closes.

The spar buoys in the harbor are maintained throughout the year.

Anchorage.—Anchor off Louisburg in 5½ fathoms, mud, with the outer end of the eastern long coal wharf bearing 275°, distant 250 yards.

At this anchorage there is some swell and undertow after heavy easterly gales, but the holding ground is good, and the water generally smooth. Vessels sometimes anchor in the western part of the harbor, but the anchorage is neither good nor well sheltered.

Directions.—The navigable entrance to the harbor, being narrow and exposed to the ocean swell, should not be attempted by sailing vessels of large draft, except with a leading wind, as the shoals on either side are of rock, and the wind often baffling and unsteady.

From the eastward leave Portnova Island about 1 mile to the northward and steer about 260°, passing southward of Wild Cove Shoal, White Rock, and Lorembec Rock, direct for the bell buoy eastward of Harbor Shoal.

From the southward make the light and whistle buoy, then steer to leave the bell buoy, eastward of Harbor Shoal, on the port hand.

Enter the harbor with lighthouses on the northwestern shore of Southwest Arm, or their lights at night, in line, 268°, and keep this mark on, passing between the deep-water channel buoys, until the leading light poles in the northern part of the harbor, or their lights at night, are in line 9°. Then turn sharply to starboard, swinging back so as to bring the light poles in line; if the turn is commenced before the alignment of these light poles is reached, the vessel will cross the bank extending southwestward from Nag Rock, on which there is a depth of only 23 feet. Keep the light poles, or their lights at night, in line, 9°, which mark leads between the shoals off Russell and Careening Points, on the east, and Battery Shoal, on the west (both buoyed), direct to the coal wharves at Louisburg; the inner pole is said to be difficult to make out. If bound to the anchorage alter course for it, when about 400 yards from the wharves.

The following additional marks may be useful: Lorembec Head in range with Lighthouse Point leads southward of the bank extending southwestward of Nag Rock and into Southwest Arm; Green Island open southwestward of Battery Island leads southwestward of that bank; a house at the head of Northeast Arm in line with Old Railway Point, 32°, leads between the shoal off Russell Point and Battery Shoal; the summit of Green Island in line with east extremity of Battery Island leads eastward of Battery Shoal.

A vessel, drawing 20 feet or less water, may, with smooth water, when northward of Rocky Island, alter course so as to leave Nag Rock buoy and the buoy off Russell Point on the starboard hand, and Battery shoal buoys on the port hand, thence steering direct toward the coal wharves.

Small vessels, by attention to the leading marks and soundings, may work in, and find excellent shelter in Northeast Arm; the width of the channel over which depths of more than 20 feet obtain is nowhere less than 500 yards except where Battery Shoal 16 to 19 feet patch occupies about 100 yards in mid-channel, and is buoyed.

Tides.—The high water interval is 7h. 45m.; mean range, 4.1 feet; spring range, 5 feet. The tidal current is scarcely noticeable except at the highest springs, when the velocity of the flood current is about ½ knot at the entrance.

Louisburg town was, under the French, the strongest fortress in North America until taken by the British in 1745–1758, when the fortifications were demolished, but some of the ruins are still traceable on the southern shore of the harbor. The inhabitants are principally employed in the fisheries, but all cultivate small farms, and the land affords good pasturage. The port is now extensively used as a coal shipping station, and steamers resort to it throughout the year. The population of the town is about 1,000.

Storm signals are exhibited at Louisburg.

Wharves.—There are several wharves at Louisburg. The two wharves of the Dominion Coal Co. are both about 700 feet long, with depths alongside up to 26 feet at low water springs; the freight wharf has a railroad siding over its full length, and vessels unload with the aid of a donkey engine; at the other wharf coal is shipped from a coal pocket, which holds 6,000 tons.

The railroad brings coal direct from the mines, which are distant about 21 miles, onto the wharves.

Coal.—The daily output of the Dominion Coal Co. is from about 5,000 to 9,000 tons. Vessels are coaled alongside the wharf by means of chutes, which are worked from two levels, 37 and 22 feet high, respectively. There are eight chutes on the western and seven on the eastern side of the wharf.

Supplies.—Meat and vegetables are plentiful, but notice would be necessary for the supply of a large quantity. The supply of bread is very limited.

Good water can be obtained from a brook near Gerratt Head, which is accessible to boats. There are two small water-tank boats.

Tugs.—Five tugs are available.

Communication.—There is a railroad between Louisburg and Sydney, which belongs to the Dominion Coal Co. Louisburg has a telegraph office.

Hospital.—A marine hospital is maintained at Louisburg.

The coast from Rochford Point forms a shallow bight between it and Black Rock Point, nearly ½ mile to the southward; it then trends southwestward about 1¼ miles to White Point, a low rocky point which juts out 700 yards from the mainland.

Gabarus Bay, a capacious inlet, is 5 miles deep westward and nearly 5 miles wide at its entrance between White Point and Cape Gabarus, which bears southwestward from it. There are copper mines in the vicinity of the bay. The fishermen, whose scattered houses are principally situated on the southern shores of the bay, are a temperate, industrious, and thriving people.

The middle of this bay is clear of shoals. Simon Point lies 1½ miles westward from White Point; about ¼ mile southward from Simon Point there are some rocks nearly dry at low water, and a shoal with 18 feet water over it extends 600 yards southwestward from the same point.

Cormorant Rocks.—Kennington Head lies 1½ miles westward from Simon Point, and Cormorant Rocks, of bare slate and only 15 feet high, are 800 yards southward of the head. The rocks are bold-to on their southern side, but rocky ground extends 400 yards eastward of them.

Harbor Rock, a low dry ledge, lies near the head of the bay, 3½ miles 262° from Kennington Head, and ½ mile northeastward of Harbor Rock is a rock with 18 feet water over it.

Harbor Point, on the southern side of the western part of the bay, is a peninsula of drift clay, overlying low slate cliffs; it forms the eastern side of Gabarus Cove, and may be approached to the distance of 100 yards. A breakwater, 190 feet in length, has been constructed at Harbor Point. There is a telegraph office at Gabarus.

Gabarus Light, fixed red, visible 8 miles, is shown, 47 feet above high water, from a white hexagonal tower, with a red lantern, 32 feet high, on Harbor Point.

Anchorage.—Gabarus Cove affords, during summer, tolerably safe anchorage in 4 fathoms, sand and clay, to vessels of moderate size, but in the heavy easterly and northeasterly gales of autumn there is so much swell and undertow that vessels have been carried from their moorings and wrecked.

Rouse Point, about ½ mile eastward of Harbor Point, is a peninsula 50 feet high, with slate cliffs, and wooded. It is steep-to, except on its southeastern side, where a reef extends off 200 yards. There is a secure boat harbor between Harbor Point and Rouse Point, and it is the only one in Gabarus Bay.

Cape Gabarus, 2¾ miles 122° from Rouse Point, is low and rocky, but some houses and a chapel are situated on the rising ground ½ mile inland from it. A rocky reef extends eastward 600 yards and Green Rock lies ½ mile eastward from the cape.

Directions.—From the westward, to anchor either in Gabarus Bay northward of Cape Gabarus or in Gabarus Cove, pass within about ½ mile from Guion Island Light and Whistle Buoy, keeping Shag Rock well open southward of Guion Island until Rouse Point opens northward of the cape. Continue northward, and when Rouse Point bears 290° steer for it; after passing the cape steer 278° and anchor 600 yards northward of the high red bank in 8 or 9 fathoms, sand, where, during westerly winds, there is good shelter and smooth water.

For Gabarus Cove, when northeastward of Cape Gabarus, steer to pass northward of Rouse Point; then round Harbor Point at the distance of about 30 fathoms, and anchor in 4 fathoms, sand, when the stores on the beach in the middle of the cove bear 110°.

Supplies.—Good water can be obtained, with some difficulty, from Irish Brook, 1½ miles from the cove, and small quantities of fresh provisions may be purchased.

Tidal currents in the bay are weak and seldom exceed ½ knot.

The coast from Cape Gabarus trends southwestward, for 3 miles, to Winging Point, 1 mile south from which is Guion Island. Several islets, ledges, and rocks lie within about 1¼ miles of this coast; of these, the most dangerous, because sometimes covered, are Bull Rock, awash at the lowest tides, 2 miles southward from Cape Gabarus, and Guion Ledges, from which a shoal extends about 800 yards eastward of Guion Island.

Guion Island is low and bare of trees.

Guion Island Light and Whistle Buoy, black, cylindrical, marked "Guion Id.," and showing an occulting white light, is moored in 25 fathoms about 3 miles 82° from Guion Island Lighthouse.

Shag Rock open southward of Guion Island, and in range with the houses on the northern shore of Fourchu Inlet, 246°, leads southward of all the rocks between Cape Gabarus and Guion Island.

Guion Island Light, fixed and group flashing, visible 12 miles, is shown 74 feet above high water, from a square white tower, with two red vertical stripes, 54 feet high, with a dwelling attached, situated at about 230 yards from the western end of Guion Island.

Fourchu Bay, between Winging Point and Fourchu Inlet, a distance of 5¾ miles to the southwestward, affords no shelter, and is dangerous to approach, as there are many rocks and shoals in it.

Shag Rock, 1½ miles 234° from Guion Island Lighthouse, is slate, and 22 feet high; it is one of the outer rocks off Fourchu Bay.

Fourchu Head is a hummock, bare of trees, and 40 feet high.

Fourchu Head Light, fixed red, visible 8 miles, is shown, 48 feet above high water, from a white square wooden tower, 32 feet high, erected on Fourchu Head.

Fourchu Inlet, on the shores of which a few families engaged in the fisheries are settled, is on the northern side of Fourchu Head. The inlet has a bar, nearly dry at low water, at its entrance, and it only affords secure shelter to boats. There is a telegraph office at Fourchu.

Fourchu Bell Buoy, red, is moored in 12½ fathoms about 1,200 yards 115° from Fourchu Head Lighthouse. This buoy is for the benefit of fishermen.

Pot Rock, with 9 feet water on it, lies 1¼ miles 119° from Fourchu Head, and only breaks in heavy weather.

Fourchu Whistle Buoy, painted red and black in horizontal bands is moored in 17 fathoms ¼ mile southward of Pot Rock.

Shag Rock in line with Green Rock and touching Cape Gabarus, bearing 39°, leads southwestward of Pot Rock and outside all the shoal water in Fourchu Bay.

The coast from the southern entrance point of Fourchu Inlet takes a southwesterly direction for 21 miles, to Michaux Point.

Framboise Cove, the bight westward of Fourchu Inlet. affords no shelter, and Outer Breaker Reef lies off its western shore, ¾ mile 156° from Red Cape, the western point of the cove.

Framboise Shoal, with 4 fathoms least water on it, lies off the middle of Framboise Cove, 1¾ miles 111°, from Red Cape.

Seal Rocks, nearly dry at low water, lie 400 yards from the shore 2¾ miles southwestward of Red Cape.

Capelin Cove is 1½ miles westward of Seal Rocks, and a few fishermen have their huts on its eastern side, where their boats are sheltered by a point of rocks.

Tilbury Rocks, upon which, at low water, the guns of a ship of war, which was lost on it many years since, may still be visible, rise from a shoal of sand and stones, which extends ½ mile from the coast 1½ miles southwestward of Capelin Cove.

St. Esprit Island, 30 feet high, of clay banks resting on slate, and partly wooded, lies 1½ miles southwestward of Tilbury Rocks. This island was formerly joined to the mainland, from which it is distant ½ mile by a beach of shingle; now a reef of rocks, partly dry at low water, extends from it to the mainland and leaves no channel. The island may be approached on its southern side to ¼ mile.

St. Esprit Island Light, fixed and group flashing, visible 14 miles, is shown 78 feet above high water from a square tower 55 feet high, painted white with two red bands, and with a dwelling attached near the eastern end of St. Esprit Island.

The coast between St. Esprit Island and Michaux Point is rocky and dangerous to approach.

Bad Neighbor Shoal, rock, with 5 feet water on it, lies 1½ miles 211° from St. Esprit Lighthouse; it only breaks in heavy weather.

The low southern Basque Islet, in line with the northern side of Michaux Point, bearing 270°, leads 1 mile southward of Bad Neighbor Shoal.

L'Archeveque Cove, 3½ miles westward from St. Esprit Island, affords shelter at high water to small vessels drawing less than 6 feet, but the bar at its entrance is nearly dry at low-water springs.

Bell Point, the eastern entrance point of Grand River, is situated about 1 mile southwestward of the entrance of l'Archeveque Cove; it is low, and shoal water and a reef, with only 6 feet over it, extends about ¾ mile 212° from the point.

Black Breaker Rock lies nearly 1 mile 149° from Bell Point, and has 6 feet water over it.

The northern side of Basque Islets and the northern side of Michaux Point in line 257° lead ¼ mile northward of the least water on Bad Neighbor Shoal, and the same distance southward of Black Breaker Rock.

Grand River rises in Loch Lomond and enters the sea about 4¾ miles westward of St. Esprit Island between Bell Point and Red Head (70 feet high). The entrance of the river is narrow and obstructed by a sand bar, over which there is a depth of about 3 feet at lowest water, and is rendered dangerous by several large rocks. The channel inside the bar carries 6 feet at lowest water to within ½ mile of a bridge crossing the river about 2½ miles inland. The current is rapid, and no attempt should be made to enter, even in boats, except at high water. The shores of the river are settled by people of Highland descent, and near the bridge are a church and a schoolhouse.

Basque Islets.—The three low Basque Islets are clay resting on slate and lie 2¾ miles 228° from Bell Point and 1 mile northeastward of Michaux Point. There is deep water northward of these islets, as well as between the islets and Michaux Point.

There are several shoals around Basque Islets; from the southern islet a shoal carrying 3 fathoms water extends ½ mile southeastward; a reef of rocks 300 yards westward; and a shoal, having a rock with 9 feet water on it, 600 yards northwestward; and from the northern islet a rock, dry at half tide, extends 400 yards westward.

Basque Shoal, lying ¾ mile 156° from the southern Basque Islet, has 4 fathoms water on it and breaks only in heavy weather.

Red Island open of Michaux Point, bearing 278°, leads southward of Basque Shoal.

Michaux Cove, situated on the northern side of Michaux Point, affords good holding ground and some shelter during westerly winds; deeply laden coasters occasionally anchor in it, and a few fishermen frequent the cove in summer; their huts are on the northern side of Michaux Point and on Basque Islets.

Anchor in 4 to 5 fathoms, sand and clay, with Michaux Point bearing 200°. It is not safe to remain at this anchorage with a southeasterly or easterly wind, and especially if the barometer is falling.

Directions.—For Michaux Cove, bring the eastern side of Michaux Point to bear 336° when it is about 1½ miles distant, and then steer 347°; pass the point at the distance of 400 yards, in 9 fathoms water, round to, and anchor.

In leaving the cove, if the wind is scant for the south passage there is a good clear channel between Basque Islets and Shag Ledge; after passing the islets, the northern sides of Michaux Point and the islets in line, bearing 257°, clear Black Breaker Rock.

Michaux Point is a wooded peninsula, about 40 feet high, joined to the mainland by a sand beach. The water is deep southward of the point.

CHAPTER VIII.

CAPE BRETON ISLAND—BRAS D'OR LAKES.

Great Bras d'Or and Little Bras d'Or entrances have been previously described.

Boularderie Island, which separates Great Bras d'Or and Little Bras d'Or, is 22 miles long, with a greatest breadth of 5 miles. Sandstone, in some parts containing coal, also shale, limestone, and gypsum, are found on its coasts, which are thinly settled; the interior is thickly wooded, and rises 400 feet above the sea.

Buoyage.—In proceeding southward through Bras d'Or Lakes from Bras d'Or to St. Peter Canal, red buoys are left on the starboard hand, and black buoys on the port hand.

Great Bras d'Or, within the entrance, trends southwestward; it is generally deep, but there is a shoal of 4 to 5 fathoms water, the southern end of which is situated ¾ mile 215° from Kelly Point, and a shoal of 4 to 5 fathoms extend southwestward 1,800 yards from a point 1 mile 203° from Kelly Point.

Black Rock Point and Table Head in line, 48° lead in the fairway between these shoals.

Anchorage.—The long reaches in Bras d'Or allow of considerable swell, and in many places the depth of water is great, which renders anchorage, except at the places noticed herein, insecure.

Seal Islands, 4 miles within Kelly Point, are two low and wooded islands, separated from the mountainous northwestern shore by a narrow and difficult channel, which is almost closed at its northeastern end by a reef which runs out 600 yards from the islands in a northerly direction.

Seal Reefs, with 2 feet least water, lie eastward of Seal Islands.

A red conical buoy marks the northeastern end of the Seal Reefs.

Seal Reefs Light Buoy, a red can, with pyramidal superstructure, exhibiting an occulting red light, marks the southern end of Seal Reefs.

The passage between Seal Reefs and islands is less than 200 yards, with a depth of 13 to 15 feet, and the ship channel between the reefs and Boularderie Island is only 200 yards wide.

The soundings in the fairway of the ship channel are 7 to 13 fathoms, rock, and the velocity of the tidal current is 2 to 2½ knots.

Shoals.—Two small rocky shoals are on the southeastern side of the channel, one, with 11 feet of water on it, lying 200 yards southwestward of Long Beach, which is situated 800 yards 110° from the southwestern end of the southwestern Seal Island, and the other, Lime Rock, with 4 feet on it, lying 665 yards farther southwestward 400 yards southwestward of Maclean Point.

Duffus Point open northwestward of Duncan Head, 41°, leads close northwestward of the 11-foot shoal and Lime Rock.

A black can buoy marks the northern side of Lime Rock.

McNeil Beach Light, fixed red, visible 5 miles, is shown, 31 feet above high water, from a white wooden tower, 33 feet high, erected in the middle of McNeil (Long) Beach, on the northwestern side of Boularderie Island.

Otter Harbor.—Otter Island, 20 feet high, and wooded, is on the western side of the channel, about 1½ miles southwestward of Seal Islands. The water is shallow between the western end of the island and Otter Point, 250 yards westward of it. Otter Harbor, on the northern side of the island, affords secure anchorage in 5 to 8 fathoms, mud, the space being about 400 yards across; the best berth is off the mouth of the small bay of the mainland, which forms the head of the harbor and has a small islet in the middle of it. The western point of this bay has a reef extending 100 yards off it. Harbor Point, its eastern point, is a peninsula separating it from the shallow cove to the northward; and 250 yards from the point, and ¼ mile northeastward of Otter Island, is the southwestern of several small islets, and a shoal with 12 feet of water on it stretches northeastward 700 yards from it. The entrance of the harbor, 250 yards wide, with 4 to 8 fathoms water, lies between this islet and a reef running northeastward, 350 yards, from Otter Island.

Directions.—From the northward, keep the southeastern part of Seal Islands open southward of Seal Point, which leads southward of the reef off the islets, until Harbor Point opens southward of the southwestern islet, bearing 270°; then haul in, and pass the islet at a distance between 60 and 200 yards; when Otter Point opens northward of Otter Island the vessel is within the reef and may anchor as convenient.

From the southward, pass Otter Island at the distance of 200 yards or more, steering 43°; and to clear the reef off the eastern end of Otter Island, do not haul into the harbor until the southwestern islet bears 315°.

Boularderie Centre is a settlement on the western side of Boularderie Island, about 7 miles within Great Bras d'Or Entrance. There is a wharf here, 164 feet in length, with a depth of 13 feet along its outer side at low water.

Man-of-war Point, on the western side of Bouladerie Island, is about 9 miles within Great Bras d'Or Entrance, where the width between shores contracts from about 1 mile (in the neighborhood of Otter Island) to about 800 yards until abreast of Port Bevis, 3½ miles farther in, the channel being deep water, 9 to 32 fathoms, with banks fairly steep-to, and clear of shoals.

Man-of-war Point Light, fixed white, visible 11 miles, is shown, 32 feet above high water, from a white square wooden tower, 32 feet high, erected on the beach at Man-of-war Point.

Port Bevis, 5½ miles southwestward of Otter Island, and on the northwestern side of the channel, is a large cove running in 1½ miles to the westward and curving round the southwestern termination of the mountainous range which continues unbroken from Cape Dauphin, a distance of 15 miles, and attains in some parts a height of 1,000 feet.

The entrance to the port is 700 yards wide and clear of shoals.

Gypsum abounds in the cliff on the southwestern side of Port Bevis and along the shore to Red Point, at the entrance of St. Patrick Channel, a distance of 5 miles southwestward.

Anchorage in Port Bevis, in 7 to 4 fathoms, mud, is secure; the depth of 4 fathoms is ½ mile within the entrance, where the cove divides into two shallow arms.

Anchor about two-thirds over toward the northern shore, the soundings being 3 to 4 fathoms, rock, 200 yards off the opposite shore.

McKenzie Point Light, fixed white, visible 11 miles, is shown, 80 feet above high lake level, from a square white tower with red lantern, 33 feet high, with a dwelling near it, on McKenzie Point, situated 1¾ miles southwestward from Bevis Point, the southern entrance point of Port Bevis.

Coffin Point lies on the eastern shore of Great Bras d'Or about 1½ miles 194° from McKenzie Point. A wharf, 185 feet in length, extends off it into 12 feet water at low lake level.

Coffin Island, a small narrow bank of red clay, lies ½ mile 236° from Coffin Point. A reef extends ¼ mile off either end of Coffin Island in a southwest and northeast direction, and there is a channel for small craft between it and the shore.

Macfarlane Point, open northward of Fraser Point, leads northward of Coffin Island Reef.

Rocky patches.—A small rocky patch of 4 fathoms lies 850 yards 147° from Macrae Point, and a similar patch of 5 fathoms lies 800 yards 307° from Coffin Point. As there may be less water on these patches, do not pass over them in a large vessel.

Kemp Head, the southwestern end of Boularderie Island, is about 1 mile 195° from Coffin Point.

St. Andrew Channel, on the southeastern side of Boularderie Island, is 1¼ to 2½ miles wide, with a generally great depth of water, which reaches in one place 141 fathoms. It is accessible to shipping at its southwestern entrance; Little Bras d'Or, the direct entrance from sea, admitting only small craft through the very narrow channel recently dredged to 17 feet.

Chapel Point, about 4½ miles within the northeastern entrance of Little Bras d'Or and on the southeastern side of the head of St. Andrew Channel, has secure anchorage off it. There is a settlement on the point which contains a chapel, and there is also a wharf. A road runs from the settlement to North Sydney.

Shoals.—Immediately southwestward of Chapel Point Anchorage, and distant ½ to 1 mile from Chapel Point, there is a shoal with 4 feet least water over it; the best channel, ¼ mile wide, is between the shoal and the western shore. Reefs extend about 600 yards southwestward of Codnor Point, and 400 yards southward of Grove Point, on the northern side of the approach to the head of the channel.

Long Island, on the eastern side of the channel, about 5 miles southwestward of Chapel Point, is narrow and runs 2¼ miles north-northeast and south-southwest, parallel to the shore, and separated from it by a strait about 300 yards wide in which there is secure anchorage, but the space is limited.

Island Point is the northeastern end of a narrow island which extends 1¼ miles northeastward from the southern coast of Boularderie Island and is connected to it by a ridge. A channel or bight about ¼ mile wide runs within the island. It is named Big Harbor, and it affords secure but confined anchorage.

The settlement of Island Point is on the southern side of Boularderie Island within Island Point. There is a wharf here 120 feet long with a depth of 11 feet at its outer end at low lake level.

Beaver Cove is about 7½ miles southwestward of the southwestern end of Long Island. A reef extends ½ mile off the cove, and for 1½ miles northeastward of it soundings of 4 to 9 fathoms extend ¾ mile offshore.

Boisdale Village is situated on the shore about ¾ mile eastward of the cove. It has about 1,500 inhabitants, and there is a station of the Intercolonial Railroad there.

Bank.—A bank with 6 to 9 fathoms water over it, and about ½ mile long north and south and 400 yards broad, lies in the entrance of St. Andrew Channel 1¾ miles 100° from Kemp Head.

St. Patrick Channel entrance, between Red and Mackay Points, is 1¾ miles wide, and the channel extends thence to Whycocomagh, a distance of 21 miles westward, with an average breadth of 1 mile. Its banks, moderately high, rise into hills of considerable elevation at a short distance from the shore, and the land is generally capable of profitable culture. The settlers, however, are few.

The channel is navigable throughout for vessels of large draft; but as it is not much known, a pilot should be employed.

During rough weather it is subject to heavy squalls of wind, which are often dangerous to open boats under sail.

Anchorage.—There are excellent anchorages in Baddeck, Cow, and Indian Bays on the northern side of the channel, and Washaback River on the southern side; indeed all the channel affords fair anchorage and good holding ground.

Mackay Point is the western entrance point to St. Patrick Channel. A wharf 206 feet long and 20 feet wide extends from the point into 12 feet at low lake level.

Double Island lies at the entrance of St. Patrick Channel between Red and Mackay Points. A reef extends ¼ mile northward of the island and shoal water of less than 5 fathoms ½ mile northeastward of it. There is also shallow water between it and the land to the southwestward.

Baddeck Bay, immediately westward of Red Point, extends northeastward 2½ miles, and excepting for a small patch of 4¾ fathoms ½ mile 100° from Kidston Island Lighthouse, and a shoal with 3½ fathoms least water over it north-northwestward of this patch, the water is deep nearly to its head, where it receives the waters of a small river. The best anchorage is within the long shingle beaches.

Baddeck Harbor, between Kidston Island, on the western shore of Baddeck Bay, and the main, affords snug anchorage for vessels of moderate size and smaller craft.

In the approach to Baddeck from sea by Great Bras d'Or Entrance (distant about 19 miles), the least depth is 29 feet on the leading marks in the channel fairway of that entrance; everywhere inside that entrance the depths are over 6 fathoms in the fairway channel.

The approach from sea for small craft, by Little Bras d'Or Entrance (distant about 28 miles), is very narrow and intricate, and only dredged to 17 feet; but the water through the length of St. Andrew Channel is deep.

In the approach from sea by St. Peter Canal and Inlet, Bras d'Or Lake, and Barra Strait (distance to canal about 32 miles), the canal portion of the route should only be used by vessels drawing 12 feet and under; otherwise the depths in the narrow winding fairway of St. Peter Inlet range from 4 to 10 fathoms, and from thence to Baddeck there is deep water.

Kidston Island Light, fixed red, visible 7 miles, is shown, 48 feet above high lake level, from a square white tower with red lantern, 50 feet high, on the northeastern point of Kidston Island, the southern entrance point of Baddeck Harbor.

Ice.—The harbor usually freezes over about January 22, and is clear of ice about April 13, being completely closed between those dates. The first vessel arrives about April 24, and the last leaves about January 6.

Directions.—There are two entrances into Baddeck Harbor, but the northern entrance is preferable, the southern being very narrow.

Pass Red Point, which is bold-to, about 400 yards distant, and steer 324° for the church, which, situated close to the shore at about ½ mile eastward of the village, is prominent. Continue on this course until the two western churches at Baddeck Village are in line, 262°; keep this mark on, which leads northward of the 3½-fathoms shoal, and when Kidston Island Lighthouse bears 234°, steer for the anchorage and moor in 4½ fathoms, mud, 200 yards 324° from the lighthouse.

With a head wind, haul close round Red Point and work up on the eastern shore of the bay, as it is free from shoals, tacking by the lead.

Baddeck, the shire town of the county of Victoria, situated on the main northward of Kidston Island, is small, but it is growing rapidly. Many Americans visit it in summer, and some have built houses there. The population was about 1,000 in 1901.

The Government wharf is 284 feet long, and extends to 18 feet at low lake level, with boat landing stages, offices, and warehouse attached.

Supplies.—Fresh meat can be purchased at the town, and good water obtained from a brook at 1 mile westward of the harbor.

Communication.—Steamers call twice a day with mails and passengers for and from Grand Narrows and Iona, where they connect with the Intercolonial Railroad, and the steamers of the Bras d'Or Steam Navigation Co., which ply daily during the season between Sydney and Whycocomagh also call. There is a telegraph office at Baddeck.

Shoals extend nearly ½ mile northeastward from Bone Island, on the southern shore of the entrance of St. Patrick Channel.

Shoal water extends ¼ mile northward of Crow Point, which is almost an island, being connected to the land by a ridge above water 1 mile westward of Bone Island. There are also shoals within the line from Crow Point to Deadman Point. A snug boat harbor is formed within Crow Point and the ridge.

Stony Island, on the northern side of the channel 1 mile above Kidston Island, is nearly awash.

Cow Bay lies 5 miles westward of Baddeck Harbor, and a sandy shoal with 18 feet water over it stretches about ½ mile eastward from its western point. The passage eastward of the shoal leads to good anchorage in the bay in 7 fathoms, mud.

Indian Bay, 1 mile farther westward, receives the waters of Middle and Baddeck Rivers, two rapid but shallow streams. The latter flows through a rich alluvial valley for some miles. This bay is very shoal near the mouth of the rivers, but there is good sheltered anchorage in other parts.

Nyanza Settlement is situated on the northern shore of Indian Bay between Middle and Baddeck Rivers. It is a port of call for the steamers of the Bras d'Or Steam Navigation Co. and is the shipping place for a large agricultural district. There is a wharf here 136 feet long.

Washaback River, on the southern side of St. Patrick Channel, 4 miles within Bone Island, is more properly a creek, as it only receives a small run of indifferent water, about 3 miles from its entrance.

Oysters of a good quality abound up the creek.

Anchorage.—There is snug anchorage in 6 to 4 fathoms within the narrow entrance of this creek; the deep-water channel runs close to Plaster Point, the eastern entrance point.

Washaback is a district on the southern side of the eastern end of St. Patrick Channel, extending about 6 miles along the shore. Washaback Center is a settlement near the middle of the district. A wharf, 218 feet in length, with a width of 12 feet at its outer end at low level, facilitates the shipment of agricultural produce and cattle.

Hume Islet lies on the northern side of the channel about 1½ miles southwestward of Cranberry Point, the western entrance point of Indian Bay.

Bell Rock, about 1,400 yards southwestward of Hume Islet, is a small stony islet, and the shoal, which extends between the rock and the land to the westward, continues for ¼ mile eastward from the rock.

A red spar buoy is moored at the eastern end of Bell Rock Shoal.

Maciver Point is on the southern side of the channel abreast Hume Islet, and Maciver Bank, with 4 feet least water, mud, extending westward 1 mile from the southern point of Maciver Point promontory, narrows the channel to ¼ mile.

A black spar buoy marks the northwestern edge of the bank of Maciver Point, and a similar buoy marks the western end of Maciver Bank.

Little Narrows Approach.—For 1¼ miles within Maciver Bank there is a deep open space. Oyster Creek, locally called Big Pond, is on the southern side of this space; a channel, 2 feet deep, has been opened into it through the sand beach, which separates the creek from St. Patrick Channel. Green Point is on the northwestern side of the channel, 2 miles 213° from Bell Rock, and about 400 yards 50° from it is a rock with 3 feet water over it.

A red spar buoy is moored on the eastern side of the rock off Green Point.

Eel Shoal, with a least depth of 3 feet over it, lies on the eastern side of the channel off Green Point.

A black spar buoy is moored on the northwestern side of Eel Shoal.

Little Narrows commence ¾ mile southwestward from Green Point, and run southwestward for about the same distance.

Little Narrows Light, fixed white, visible 10 miles, is shown, 40 feet above high lake level, from a square white lighthouse, 35 feet high, on Curlew Point, southern side of the eastern entrance to Little Narrows.

A red spar buoy is moored on the southern end of the bank off the western entrance point of the southern entrance to Little Narrows.

Little Narrows Settlement is on the southern side of Little Narrows. There are two wharves and a ferry slip here.

Whycocomagh Light, fixed red, visible 7 miles, is shown, 31 feet above the sea, from a mast 25 feet high with a white shed at its base, on Frazer Point, 4 miles westward of the southern entrance to Little Narrows.

Whycocomagh Village is on the northern side of Whycocomagh Bay at the head of St. Patrick Channel, and nearly 2 miles northwestward of Frazer Point. There is a wharf here, 228 feet long, with a depth of 12½ feet at its outer end at low lake level. A basin 300 feet long and wide, and approach channel 1,100 feet long and 100 feet wide, have been dredged to a depth of 13 feet, in direction 216° from the wharf, the channel being marked by a black and a red spar buoy at the outer end, and a similar pair of buoys near the wharf.

Communication.—Steamers of the Bras d'Or Steam Navigation Co. ply daily during the season between Sydney and Whycocomagh.

Directions.—The navigation of St. Patrick Channel, eastward of Maciver Point, being wide, is easy. Pass between Stony Islet on the northern side of the channel, and the shoals off Bone Island and Crow Point on the southern side; then keep toward the northern side of the channel.

Westward of Maciver Point the channel becomes narrow; leave the black buoys marking the bank off Maciver Point and the western end of Maciver Bank on the port hand, and Bell Rock shoal red buoy on the starboard hand.

If the buoys are not in place, bring Cranberry Point in line with Cow Point, bearing 39°, and keep this range on astern, until Bell Rock is in range with Hume Islet, bearing 22°; keep this latter range on astern, until Narrows Church is in range with the bank of Curlew Point (the eastern entrance point of Little Narrows, on which is the lighthouse), 229°, which leads in mid-channel between Eel Shoal and the rock off Green Point; on approaching Curlew Point alter course to 246°, when having cleared its low marshy point, steer 212° for the sandy spit on the southern side of Little Narrows Entrance.

Round this spit, which is bold-to, as close as convenient, and steer with Narrows Church and the sandy spit in range astern, bearing 16°, to clear the shoal extending 200 yards southward from Narrows Point.

Having cleared this shoal, a course 246° leads up the middle of a lake 1½ miles wide and 6 miles long to the anchorage off Whycocomagh Settlement, but the shoal water extending 400 yards off the shore eastward of Frazer Point, and a shoal extending ½ mile northward from the western point of Maciver Island must be avoided. The water shoals toward the head of the lake, where the bottom is mud, and anchorage safe. There are sheltered anchorages on the southwestern side of Indian Island (where the water is deep) and the southern side of Maciver Island, but these are not frequented.

There are no tidal streams, nor any perceptible rise of tide, but the waters of the lake are affected by the prevalent winds, being highest during northeasterly winds, and lowest during southwesterly winds. The difference of level is seldom more than 1 foot.

Great Bras d'Or, southwestward of its junction with St. Andrew Channel, is 9 miles long from Kemp Head to Barra Strait, and 3 to 5 miles wide. The depth of the water is very irregular, exceeding 60 fathoms in some parts, while in others there are shoals. Settlements are thinly scattered along the shores.

Burnt Shoal.—About ½ mile southward of Mackay Point is Burnt Point, from which a reef runs out 350 yards; Burnt Shoal lies ¾ mile, 63°, from Burnt Point, and has a least depth of 21 feet on it.

Boulaceet Harbor, 2½ miles southwestward of Burnt Point, is 700 yards wide at the entrance between Parliament and Gillis Points. On the northern shore of the harbor, 600 yards within the entrance, is a long shingle spit, which is quite bold-to, and the deep water, 5 to 4 fathoms over mud bottom, continues 400 yards farther in, the whole distance from the entrance to the head of the harbor being ¾ mile, and the least breadth, at the shingle spit, 200 yards.

Gillis Point is the southwestern entrance point of the harbor; a reef, on which there is a depth of 9 feet 200 yards from the point, extends rather more than that distance northeastward from it.

Gillis Point Light, fixed white, visible 14 miles, is shown, 74 feet above high lake level, from a square white lighthouse with a red lantern, 38 feet high, with a dwelling attached, situated about 100 yards westward of Gillis Point.

A black spar buoy is moored at the end of the reef extending from Gillis Point.

The shore is bold for 2 miles southwestward of Boulaceet Harbor; thence shoals extend off it for the remaining 2 miles southward to Barra Strait, reaching distances of 800 yards off Lieutenant Pond, and 400 yards off Macpherson Point.

Macphie Shoal, with 18 feet least water, lies ¾ mile off the southeastern shore of Great Bras d'Or, with Black Point bearing 196°, distant 1 mile; there is much rocky and uneven ground with soundings of 5½ to 10 fathoms within about 1 mile northward to westward from the shoal.

Big Shoal, 2½ miles farther southwestward, is an extensive rocky bank, with very irregular soundings; besides several patches of 3 fathoms, one, near its northern part, and with Longbeach Point bearing 111°, distant about 1.1 miles, dries at low water.

The northern patch of Big Shoal is marked by a black spar buoy on its northwestern side, and a red spar buoy on its southeastern side.

Christmas Island lies close to the southeastern shore of Great Bras d'Or 1¾ miles from Barra Strait. Shoal water extends 300 yards northward of the island. There is an excellent harbor within the island for boats and small craft, the narrow entrance, carrying 6 feet water, being from the westward.

A dredged channel into this harbor is marked by four red spar buoys on its northwestern side, and by four black spar buoys on its southeastern side.

Anchorage.—There is good anchorage, excepting in strong northeasterly winds, ½ mile southwestward of Christmas Island, in the bay between it and Neilban Cove, in 9 fathoms, mud; but shoal water extends 400 yards westward of the island. There is a large white chapel on the mainland, near the island.

Barra Strait, commonly called the Strait of Barra, and by the country people Big or Grand Narrows, is 1¼ miles long, and ½ mile wide, excepting at its northern entrance, where the breadth is reduced to 550 yards by the sand and shingle beaches off Uniacke and Kelly Points, which are respectively the western and eastern points of entrance. These beaches are bold at their extreme points, but shallow on their northern sides to the distance of ¼ mile from the shore. The strait southward of Kelly and Uniacke Points is from 7 to 33 fathoms deep, and the shores are bold on both sides.

Kelly Shoal extends ¼ mile 15° from Kelly Point and 400 yards from the beach of Kelly Pond; Derby Point, the southeastern entrance point of the strait, open westward of Kelly Point, clears its western side, on which there are 14 feet water.

A spar buoy is moored on the northwestern end of Kelly Point Shoal.

Barra Shoal, of rock, and ¾ mile in length, lies across the northern entrance of the strait, and its shoalest part of 11 feet bears 34°, distant 1,300 yards from Uniacke Point; this shoal, together with the shoal off Kelly Point, renders the northeastern approach to the strait indirect, and difficult at times for a vessel of large draft.

The ship channel, southeastward of Barra Shoal, and between it and Kelly Point Shoal, carries 6 to 12 fathoms of water, over rock.

A spar buoy, painted black and red in horizontal bands, is moored on Barra Shoal.

Hector Point in line with Uniacke Point, 206°, leads westward of Barra Shoal. Kelly and Hector Points in line, bearing 224°, lead into the entrance of the ship channel, which is to the southeastward of the shoal.

Railroad bridge.—A swing railroad bridge crosses Barra Strait from Kelly Point to Uniacke Point. The swing opening for the passage of vessels is on the Kelly Point side of the strait, 100 feet wide, the channel being immediately westward of the pier end, which forms the pivot of the movable portion. Difficulty is experienced in opening the bridge in winter owing to ice.

Iona Light, fixed white, visible 10 miles, is shown, 29 feet above high lake level, from a square white building with a red lantern, 20 feet high on Uniacke Point.

Grand Narrows Bridge Lights.—A fixed white light, which should be seen from a distance of 7 miles, is exhibited from an iron frame on the railroad bridge over the end of the pier off Kelly Point. Immediately below this white light a fixed red light is exhibited when the channel is closed, and a fixed green light when it is open for the passage of vessels.

Tides.—The tidal rise in Barra Strait amounts only to a few inches, and it is difficult to distinguish it from changes of level caused by wind. The velocity of the currents is very irregular, and seldom exceeds 1 knot, excepting when increased by wind.

Directions.—In proceeding southwestward through Great Bras d'Or, keep on the northwestern shore to avoid Big Shoal until abreast Boulaceet Harbor; then steer toward the western end of Christmas Island, until Kelly and Hector Points are in line, 224°; keep this mark on until the western side of Neilban Cove bears 156°, then steer 238° for Uniacke Point, until Derby Point opens westward of Kelly Point, when shape a course to pass through the bridge and strait.

Great care is necessary in going through the opening in the bridge, for the bridge crosses the strait at an angle to the direction of the current through it, the north-going current setting toward Gillis Point, and the south-going current toward Derby Point. The currents through the openings in the bridge are rapid.

No signal is made from the bridge to show that vessels can pass through; the bridge is usually opened when a vessel is seen approaching, but sometimes it is closed until a vessel is very near it. Therefore caution is necessary, especially when going with the stream.

Note.—Vessels and tows are responsible for any damage caused to the railroad bridge by reason of such vessels or tows being carelessly or negligently handled.

Grand Narrows Settlement is on the eastern side of Barra Strait. It is an important station of the Intercolonial Railroad, it is also a landing place for steamers, which call twice a day with passengers and mails for and from Baddeck, and make connection with the trains going east and west. There is a wharf here with a depth at its outer end of 11 feet at low lake level.

Iona Settlement is on the northwestern side of the strait at the northwestern end of the railroad bridge. It is a station of the Intercolonial Railroad, and a landing place for the steamers of the Bras d'Or Steam Navigation Co. During the season of navigation a steamer makes two return trips daily, and in winter keeps up daily communication, between Baddeck and Iona, ice and weather permitting. There is a wharf here, 260 feet in length, with a depth at its outer end of 10 feet at low lake level.

Bras d'Or Lake is 12 miles across from Barra Strait to the entrance of St. Peter Inlet, and 37 miles from the head of West Bay to that of East Bay. The depth of water in it is very irregular; its greatest known depth is 70 fathoms, and there are numerous shoals.

Derby Point Light, fixed red, visible 11 miles, is shown, 77 feet above high lake level, from a square white tower, 38 feet high, on the western part of Derby Point, the southeastern entrance point of Barra Strait.

Mackinnon Shoal.—Mackinnon Point lies 4¼ miles westward of Hector Point, the southwestern entrance point of Barra Strait. Mackinnon Shoal is a rocky bank, with 18 feet least water, stretching out southeastward 1½ miles from Mackinnon Point.

There are several other shoals in the bay between Hector Point and Malagawatchkt Point, which bears 221°, 6½ miles. In the head of the bay there are several islands, northward of which is Mackinnon Harbor, having 20 feet water in its dredged entrance channel, 150 feet wide, and a pier extending to 20 feet at low water within the entrance of the harbor, from which gypsum is shipped; Denys River flows into the western part of the bay.

Hector and Kelly Points in line bearing 46° lead 400 yards eastward of Mackinnon Shoal.

Denys River is a small stream, having its sources in the eastern slope of the hills eastward of Judique, and its general course is eastward. It enters Bras d'Or Lake through two deep-water inlets called North and South Basins, the mouth of the river proper being at the western end of South Basin. North Basin is 2 miles long, west and east, and ½ mile wide, while South Basin is 5 miles long east-northeast and west-southwest, and ¾ mile wide. A depth of 8 feet water can be carried up the river for 2 miles, and boats can ascend, with some difficulty on account of sunken driftwood, about 5 miles farther to the bridge; above this the stream becomes rapid and shallow.

The main entrance of the river from the lake lies between Campbell Island, a low wooded island, and Mackinnon Point, and is 1 mile wide. It is the first opening in the low land after passing the hilly country forming the western side of Barra Strait. In the fairway of the channel there is a depth of 4 fathoms water for a distance of 6 miles into South Basin, with excellent anchorage there off the settlement at Plaster Cove.

The river is visited by small schooners trading for produce. The settlers are of Highland descent, and support themselves entirely by farming.

Excepting the range of hills between the river and West Bay, the land is generally low and wooded, and there are no remarkable features.

Campbell Island Light, fixed white, visible 10 miles, is shown 30 feet above water, from a lantern on a mast 24 feet high, with a white shed at its base and a hut close to it, on the eastern side of Campbell Island.

A red spar buoy marks the southwestern end of the shoal ground about 400 yards off Mackinnon Point; and a black spar buoy marks the eastern end of the shoal extending eastward from Campbell Island.

A red spar buoy marks the western side of the channel into the Boom, westward of Cranberry Island; and a similar buoy marks the eastern end of the shoal ground off Stony Point, between North and South Basins. There are also two black spar buoys and a red spar buoy in South Basin westward of Plaster Cove.

Anchorage.—There is good anchorage in nearly every part of both North and South Basins; a convenient position in South Basin is northward of Plaster Cove, ¼ mile offshore in 18 feet of water, mud bottom; and there is a settlement at the cove, where supplies may be purchased and wood and water obtained.

Current.—There is some little current in and out of the narrow parts of the channels leading into Denys River, but it seldom exceeds ½ knot, and its direction depends upon the wind, thus: Rising water and in-going current with northerly winds, and falling water and out-going current with southwest and southerly winds.

Directions.—The chart is the only guide, but the channels being narrow and tortuous, local knowledge is necessary for safe navigation.

Cod Shoals, extensive rocky fishing banks, with 21 feet least water, lie 1½ to 3 miles southward of Barra Strait.

Hector and Uniacke Points in range, bearing 26°, lead ½ mile westward of these shoals, and through the channel, 2 miles wide, between them and Mackinnon Shoal.

The wide central part of Bras d'Or Lake is generally clear and deep.

Malagawatchkt Harbor, situated between Malagawatchkt and Militia Points, runs in northwestward, 3¼ miles, and its head is separated from Denys River Basin by a low neck of land, 120 yards wide. The entrance of the harbor, between Gillis Point, which lies ¾ mile southwestward of Malagawatchkt Point, on the north, and Pellier Point, on the south, is ¾ mile wide, but Sheep Island, on the northeastern side of Pellier Point, reduces the width to 800 yards. At the first narrows, 1 mile within the entrance, the width of the channel contracts to 320 yards with a deep-water width of 160 yards; inside these narrows the harbor opens into a fine basin about 1,200 yards across either way, and with a general depth of 4¼ to 6 fathoms. From the northern side of this basin, the second narrows, 270 yards wide, but with a 4-fathom channel much less in width, communicates with the inner harbor, and the 4-fathom channel continues nearly to its head.

A channel for boats, 1,000 feet in length, 12 feet in width, and 1 to 1½ feet in depth at ordinary lake level, has been opened between the head of the harbor and Denys River Basin

Gillis Shoal, with 11 feet least water, lies from 700 to 1,200 yards southeastward of Gillis Point. There is deep water around the shoal, but the widest and most direct channel into Malagawatchkt Harbor is southward of it, where the breadth of the deep water, between it and the reefs of Pellier Point and Sheep Island, is 600 yards.

Pellier Point Reef, with 8 feet water on it, extends 700 yards eastward from Pellier Point.

Militia Point and the eastern end of George Island in line, bearing 241°, leads just southward of Pellier Point Reef, and the southern side of the first narrows open northward of Sheep Island leads northward of Pellier Point Reef, but over the northern part of the reefs off Sheep Island.

Patch.—A small rocky patch, on which not less than 28 feet water was found, lies 1,400 yards 112° from Pellier Point. From it the southern sides of Militia and Green Islands are in line and the southern end of Sheep Island and the southern side of the first narrows are also in line.

Directions.—To enter Malagawatchkt Harbor from the eastward, approach with Militia Point and the southern end of George Island in line, bearing 241°, which mark leads 600 yards southward of Gillis Shoal. When the northern side of Sheep Island is in line with the eastern point of Johnson Cove, bearing 268°, alter course so as to keep that mark on until Militia and Pellier Points are in line, bearing 226°; then steer 301° until the northwestern side of Militia Island and Pellier Point are in line, bearing 202°; then steer about 285°, so as to keep in mid-channel, until at the first narrows, when alter course to the northward so as to avoid the shoal just within the narrows, which extends 250 yards from the southern shore. The deep-water channel in the narrows, being only 160 yards wide, requires care; when through this channel anchor over toward the northern side of the basin in 6 to 7 fathoms, mud, and completely sheltered.

Pellier Harbor, into which the depth of 21 feet can be carried without difficulty, is formed by the peninsula of Pellier Point, where there are several buildings on its southwestern end, and a long shingle beach runs westward from it and shelters the harbor from the southward.

Militia Island lies ½ mile southward of Pellier Harbor and 800 yards eastward from Militia Point. A reef runs out 250 yards northwestward of the island, and shallow water to a less extent all around it.

Directions.—From the eastward, approach Pellier Harbor by the preferable channel northward of Militia Island, where the deep water is 450 yards wide. Bring Militia Point to bear 246°, and run toward it until Pellier Point and Sheep Island are touching; then steer for the entrance of the harbor. In entering the harbor, haul round the shingle beach at any distance between 150 and 250 yards, and anchor within it in 4 to 4½ fathoms, mud.

From the southward, run between Militia Island and Militia Point, where the deep water is 300 yards wide, with the western end of the peninsula of Pellier Point, where it is united to the mainland by the beach of Johnson Cove, just open westward of the point of shingle beach at the entrance of the harbor, bearing about 4°. This mark also leads eastward of the 17-foot shoal situated 550 yards southward of Militia Point. The reef off the northern part of Militia Island is generally above water, but it has 9½ fathoms close-to, and to clear it when covered take care not to bring the western point of shingle beach at the entrance of the harbor to bear westward of 0°.

West Bay.—Poor Islet lies about 3½ miles 175° from Militia Point, and the entrance of West Bay is between them. The width of the bay within the entrance increases to 5 miles, while the bay extends southwestward for 11 miles. Over this area the soundings are irregular to an extraordinary degree, and there are numerous rocky shoals, covered by only a few feet of water, having a depth of 20 fathoms or more near and between them.

On the northern shore of West Bay a parallel range of wooded hills runs southwestward from Little Harbor, separating the bay from Denys River, and attaining a height of 768 feet. These hills are steeper than those on the opposite side of the bay, and leave a smaller space for settlements, which are not extensive, excepting at Little Harbor.

Cliffs of red sand and clay, and sandstone, alternating with shingle beaches which inclose ponds or unite peninsulas to the mainland, form the predominating features of the southern shore of West Bay; inland of which, at distances of ½ to 1 mile, a range of wooded hills rises to the height of 600 feet. On the slopes of these hills, or between them and the shore, there are fine settlements and two kirks or Scotch churches; one is near the eastern point of Pringle Cove, and the other, which has a steeple, is situated at Black River, 400 yards back from Ballam wharf and store, and is hidden by intervening land, excepting from northwestward.

Little Harbor, 1¼ miles westward of Militia Point, has an unobstructed entrance, 80 yards wide, with 3 fathoms water, which leads into a landlocked basin ¾ mile across, and carrying 3½ to 4¼ fathoms water, mud bottom. The distance from the entrance to the head of this beautiful harbor, where it is separated from Malagawatchkt by an isthmus about 250 yards across, is 1 mile northward.

A rocky bank, with 19 feet least water on it, lies ½ mile southward of the entrance of Little Harbor.

George Island, properly a peninsula, since it is united to the mainland by a shingle beach, is situated southwestward 1½ miles from Little Harbor Entrance.

Between George Island and Macleod Point, on the southern shore, a distance of 3¼ miles, are the following numerous rocky shoals:

Paddle Shoal, the northeasternmost, lies 1 mile 122° from George Island, and extends 800 yards farther in the same direction, the least water on it being 13 feet.

A red spar buoy is moored on the western edge of Paddle Shoal.

Outer Shoal, which extends ½ mile northeastward and southwestward, with a breadth of about 400 yards, lies with its northeastern end bearing 156°, distant ½ mile from the southeastern 3-fathom patch of Paddle Shoal, and the depths on it are 3¾ to 4¾ fathoms.

Malagawatchkt Point, in line with Pellier Point, bearing 27°, or midway between it and Militia Island, leads southeastward of Paddle Shoal, and between it and Outer Shoal. Malagawatchkt Point, just open eastward of Militia Island, bearing 21°, leads close southeastward of Outer Shoal.

George Shoal, which is separated by a narrow channel from the southern end of George Island, and extends from it 800 yards to the southeastward, has 8 feet least water on it.

A red spar buoy is moored on the western edge of George Shoal.

Nameless Shoal, 1,200 to 1,700 yards 167° from the southern end of George Island, has a least depth of 14 feet on it.

A black spar buoy is moored on the eastern edge of Nameless Shoal.

Middle Shoal, with 17 feet least water on it, 1,200 yards southward of Nameless Shoal, with Green Island bearing 285°, distant 1 mile.

The northeastern side of Clarke Island and the southwestern side of Green Island in line, bearing 294°, lead southwestward of Middle Shoal.

Macleod Shoals, on which the least water is 19 feet, lie between Middle Shoal and the reef extending ¼ mile from Macleod Point on the southern shore.

Poor Islet and the southern end of Morrison Head Peninsula in line, bearing 106°, lead northeastward of Macleod Shoals.

Pringle Shoal, ½ mile southwestward of Macleod Shoals, has 12 feet least water over it. It extends from 600 to 1,400 yards northward of Pringle Island.

A black spar buoy is moored at the northern end of Pringle Shoal.

A group of wooded islands, about 50 feet high, with cliffs of sand, clay, and bowlders, and connected by shingle beaches when not separated by narrow channels, extends off the northern shore of West Bay from George Island to Ranald Islet, a distance of 4 miles to the southwestward. The group includes Cameron, Green, Clarke, Rook, Calf, Cow, Tailor, and Low Islands. Anchorage is good between them and the northern shore.

Clarke Cove (Macdonald Harbor), which lies northward of Cameron Island and affords very good anchorage, may be approached either through the narrow channel between George and Cameron Islands or between Cameron and Green Islands, where the passage is ½ mile wide, but a reef, with 5 feet water on it, extends 600 yards from Cameron Island toward Green Island and reduces the navigable breadth to 400 yards.

Clarke Cove Range Lights.—The front light, fixed red, visible 8 miles, is shown 46 feet above high lake level from a square white tower, 32 feet high, on the northwestern shore of Clarke Cove.

The rear light, fixed red, visible 11 miles, is shown 244 feet above high lake level from a similar tower, 20 feet high, on the hillside, 266 yards, 293°, from the front lighthouse.

These lighthouses or their lights in line lead between Paddle and Nameless Shoals and between the shoals off George and Cameron Islands.

Directions.—From the eastward pass 600 to 800 yards southward of the 17-foot shoal off Militia Point, on a course about 270° for the northern extremity of George Island, until Militia and Pellier Points are in range, bearing 47°; turn on this range and keep it on astern until the Clarke Cove Lighthouses open southwestward of the southwestern extremity of George Island, whence proceed into Clarke Cove, between George and Cameron Islands, with the lighthouses in range 293°; George Shoal Buoy is left on the starboard hand and Nameless Shoal Buoy on the port hand. From the southeastward the lighthouses in range lead between the shoals into the cove. To enter the cove between Cameron and Green Islands keep Militia and Pellier Points in line until Clarke Cove Lighthouses appear in range with the southwestern extremity of George Island; then steer 241° for Green Island until the northern sides of Clarke and Rook Islands are in range 264°; keep this range, which leads between Green Island and the reef off Cameron Island, until the western side of Green Island bears 156°, when alter course to 308°, to pass nearly midway between the shallow water off the southwestern side of Cameron Island and Rook Shoal, which, with 17 feet water on it, lies 353° 600 yards from the eastern end of Rook Island.

Continue the same course until 200 to 400 yards from Clarke Point, or until the eastern end of Cow Island is seen over the shingle beach which unites the two parts of Rook Islands bearing 199°. Keep this bearing on astern, which leads into the harbor, passing westward of the 3-fathom patch lying 450 yards off the western point of Cameron Island, and when George Island is well open northward of Cameron Island the vessel is within that patch. Avoid the reef which runs out ¼ mile westward from the point separating the two coves at the head of the harbor, either by anchoring with the points on the northern side of Cameron Island in range, bearing 105°, or by keeping Rook Island open westward of Cameron Island, bearing 195°, which mark leads northwestward of the reef and into the mouth of the northeast cove.

Shoals and channels.—Shallow water does not extend beyond 200 yards from the outer points of Green, Calf, and Tailor islands. A rocky bank with 25 feet water lies about 1,400 yards 83° from Calf Island. Tailor Shoal, with 22 feet on it, lies ½ mile 122° from Tailor Island; there is a depth of 30 fathoms close to this shoal, and the deepest water in the bay, 36 fathoms, is distant from it ¾ mile to the southward. There is a clear channel between Tailor Shoal and Calf and Tailor islands.

Shallow water connects Tailor Island with Low Island, which lies ¼ mile northwestward from it; a reef, partly dry, runs ¼ mile northward from the northern end of Tailor Island, leaving a channel 200 yards wide, with 4 fathoms, between Tailor and Cow Islands; this channel passes within 100 yards of Cow Island, from which shallow water extends 200 yards northward.

There is a narrow channel with 20 feet water through the reef which stretches nearly across from Low Island to the main and has a least depth of 5 feet over it.

Directions.—To proceed to the confined but safe anchorage between Tailor and Cow Islands, keep in mid-channel between the islands and anchor in 7 fathoms, mud, midway between the northern end of Tailor Island and the southern part of Cow Island, with the southwestern points of Cow and Calf Islands in line and with the eastern end of Rook Island seen over the shingle beach which unites the two parts of Cow Island, bearing 49°; this anchorage is small, the deep water being just over 400 yards across in the widest part.

Crammond Islands.—Floda Island and the two Crammond Islands form a separate group 1¾ miles in length, lying 1 mile southwestward of Ranald Islet, with a clear passage between; the islands present cliffs of red sand and clay to seaward and are 50 to 70 feet in height.

There is a secure harbor for small craft and boats between the Crammond Islands.

Smith Shoal, ¼ mile across, with a least depth of 3 feet over it, bears 134°, nearly 650 yards from the southern point of the eastern Crammond Island. A reef runs out 600 yards from the southern point of the western Crammond Island toward Smith Shoal, leaving only a narrow channel between them.

The southeastern ends of Floda and Tailor Islands in range, bearing 21°, lead close southeastward of Smith Shoal.

Anchorage is not good around these islands because of the great depth of water.

Mid Shoal, with 3 fathoms on it, lies about 1,800 yards 319° from the northeastern point of Crammond Islands.

The southern points of Tailor Island and Ranald Islet in range lead southward of Mid Shoal in depths of 4½ to 20 fathoms.

Dumpling Island lies 1¼ miles westward of the northeastern end of Crammond Islands; a reef extends about 200 yards off the island and nearly 600 yards off its western end toward Widow Point, which lies ½ mile westward of the island.

Macleod and Ross Creeks and North Cove, westward of Widow Point Peninsula, afford secure anchorage in 3 to 3½ fathoms, mud, but their entrances between the shoals of less than 3 fathoms are only 80 yards wide.

The channel westward of Crammond Islands, between them and Spruce and Widow Points, is deep and clear, except a shoal with 15 feet least water in Malcolm Cove and the reefs off either end of Dumpling Island. There are two small patches of 28 and 27 feet 800 yards 170° from Dumpling Island and 600 yards 49° from Spruce Point, respectively.

Head Bay Cove.—The head of West Bay between Spruce Point and Ballam Head is 1¾ miles wide and 3 miles deep from Spruce Point to Head Bay Cove. It affords shelter to boats, but it has no secure anchorage. Magnus Islet lies southwestward nearly 1 mile from Spruce Point and ¼ mile offshore. A reef extends eastward ½ mile from the first point southward of Spruce Point, and a reef extends northeastward 700 yards from Magnus Islet. A reef partly dry connects Magnus Islet with a point 700 yards to the westward and then runs out ½ mile southward to the depth of 3 fathoms and an equal distance farther with 22 feet, stretching from the northern shore of the head of the bay to 900 yards from Ballam Head.

Ballam Shoal is an extensive rocky bank with 16 feet least water, running out ¾ mile eastward from Ballam Head.

Black River flows into West Bay about 1½ miles eastward of Ballam Head, and there is confined anchorage off its mouth sheltered by Macrae Islet and its reefs, which to the eastward unite the islet to the peninsula of Gooseberry Pond and extend 750 yards northwestward from the islet. In approaching this anchorage steer 188° for the kirk, passing between Ballam Shoal and this reef until the northern side of the islet bears 90°, then steer 107° to pass midway between the islet and Murray Point, passing between a reef off the islet and a shoal with 16 feet water over it, lying 700 yards 291° from Murray Point, and anchor when far enough in to be sheltered by the islet and its reef from northeasterly winds. This anchorage is narrow, intricate, and only suitable for small vessels.

The peninsula of Big Pond is situated about 1½ miles northeastward of Black River Entrance, and the outer extremity of a reef lies 800 yards 325° from the peninsula. The least water on this reef, which runs in nearly to the shore, is 9 feet.

Macintosh Cove is 1,600 yards northeastward of Big Pond Peninsula. Macintosh Islet lies off it and with the reef uniting it to the mainland shelters the cove from easterly winds.

Anchorage is good in the cove in 4½ fathoms mud, but the cove is only ¼ mile across and the deep water of over 3 fathoms only 200 yards wide.

Macinnis Shoals, of rock, lie off the mouth of Macintosh Cove, the least water, 18 feet, bearing from Macintosh Islet, 280°, about 300 yards. There is a passage between these shoals and the islet; that between them and Macinnis Point is the widest and best. The outer of these shoals, on which the depth is 22 feet, extends 1,800 yards, 275° from Macintosh Islet.

The channel between the reef off Big Pond and the outer Macinnis Shoal is ¼ mile wide. To run through, bring Macintosh Islet to bear 78° and steer for it until off the mouth of the cove.

About 1,200 yards eastward of Macintosh Cove a reef runs out northward from a shingle beach 600 yards to the depth of 3 fathoms, and ¾ mile to 5 fathoms; the beach incloses a small pond.

Macinnis Point open northward of Macintosh Islet, bearing 212°, leads northwestward of the whole of this reef.

Pringle Island is situated 3 miles northeastward of Macintosh Cove; there is a secure harbor for small craft within the island.

The Points is a scattered settlement extending along the shore for 4 miles in the vicinity of Pringle Island.

A wharf, 250 feet long and 20 feet wide, extends into 12 feet at low lake level, from the Points abreast Pringle Island.

About ½ mile northeastward of Pringle Island there is a shoal, with 14 feet water on it, lying 4 cables off-shore.

Macleod Point is about 1 mile eastward of Pringle Island, and a reef extends about 600 yards northward of the point. There is a harbor for boats within the peninsula of the point.

Poor Islet, lying 1 mile eastward of Macleod Point, is very small, and united to the shingle beach of Poor Point by a reef; shoal water extends ¼ mile northward of the islet, and a rocky bank, with 18 feet water, lies ½ mile eastward of the islet, from which it is separated by a very narrow channel.

Pringle Island open northward of Macleod Point, bearing 233°, leads northward; and Morrison Head and Macrae Point in line, bearing 115°, lead northeastward of Poor Islet Shoals.

Morrison Head, 1½ miles eastward from Poor Islet, is a small peninsula, 60 feet high, with red cliffs, united to the southern shore by a shingle beach. Shallow water extends 400 to 800 yards off the peninsula. There is a small boat harbor on its eastern side. A rocky bank, with 4½ fathoms water, lies 1,200 yards 32° from Morrison Head.

Macrae Point is 2¼ miles eastward of Morrison Head, and a rocky bank, with 21 feet water, lies midway between them; its northern end is ¾ mile 336° from Scott Brook. A shoal, with 13 feet water, lies 800 yards 325° from Macrae Point and 600 yards offshore, and there is a small patch of 4¼ fathoms 1,800 yards eastward of Macrae Point.

Kelly Shoals, with 4 feet least water, rock, lie off the entrance of St. Peter Inlet, and nearly midway between Macrae Point and Red Islands to the northeastward. The shoals are distant 1½ miles from Macrae Point, and they occupy a space about 1½ miles long, west and east, and 1 mile wide.

There is deep water around these shoals, but the passage between them and Macrae Point is better than that eastward of them.

Kelly Shoals are marked by a black can buoy on their northwestern side and by a black spar buoy on their southeastern side.

The southern end of Red Islands in line with Mill Cape, a rocky and precipitous point distant 2 miles from the islands, bearing 66°, leads northward of Kelly Shoals. Trap Point and Indian Point in line, bearing 160°, the former being the western point of Chapel Island, in St. Peter Inlet, on the summit of which is a large cross, leads over the western end of Kelly Shoals in 5 fathoms water.

Cape St. George lies about 2 miles southeastward from Macrae Point and at the western side of the northern entrance to St. Peter Inlet.

A shoal, 600 to 800 yards across, and with 3 to 4 fathoms over it, lies about ¾ mile northward from Cape St. George.

Trap and Indian points in line leads close eastward of this shoal.

Cape St. George Light, fixed white, visible 10 miles, is shown, 50 feet above high lake level, from a square white tower 20 feet high, with a dwelling attached, on Cape St. George.

A fog signal answers vessels' signals.

St. Peter Inlet.—The entrance of St. Peter Inlet is between Cape St. George and Evans Point, which bears 58°, distant 1½ miles. From this entrance to the northern entrance of St. Peter Canal the distance is 7½ miles, and navigation is not difficult. The scenery in the inlet is very fine, but the shores as yet are thinly settled. The country is based upon silurian rocks, graywacke, slate, and carboniferous limestone, covered by a tolerably productive soil.

On the eastern side of the northern part of this inlet are Macnab Creek and Soldier Cove, which have depth of water sufficient for vessels of large draft, but can only be approached by passing through narrow channels between shoals; by keeping over toward Cape St. George and passing westward of Chapel Island the fairway is clear until off Trap Point, its western point, where the channel between it and Dock Point, a shingle beach of the mainland, inclosing a small pond, is ½ mile wide.

Anchorage.—There is good anchorage in 8 fathoms water, mud, off the southwestern side of Chapel Island, with the large cross bearing 10°, the chapel, near the southern end of the island, 116°, and 200 to 400 yards offshore.

Doctor Island lies ½ mile southwestward of Chapel Island and diagonally across the inlet; Gregory Island lies about 200 yards westward from the northern end of Doctor Island, and a reef extends from the southwestern end of Doctor Island, leaving passages northwestward of Gregory Island and between the reef and Indian Point, each about ¼ mile wide.

Gregory Island Light, fixed red, visible 7 miles, is shown, 30 feet above high lake level, from a square white tower, 33 feet high, on the western point of Gregory Island.

The passage between Doctor Island and Indian Point is so intricate as to be only suitable for small vessels, but the ship channel, which curves around Gregory Island and between it and the mainland to the westward, is clear from detached shoals and carries 8 to 10 fathoms water. It is, however, reduced to the breadth of 200 yards by shoals on either side. The channel southwestward of Doctor Island becomes intricate, but it has a least depth of 4 fathoms until within 400 yards from the wharf at Haulover Isthmus. To reach the wharf, vessels pass over rather more than 12 feet, which is the depth of water between it and Campbell Island, and the turn to enter the canal is very sharp.

Beaver Island Light, fixed red, visible 5 miles, is shown from a lantern on a mast 25 feet high, with a white shed at its base, on the southeastern point of Beaver Island 2½ miles southwestward of Doctor Island.

Marjorie Island Light, fixed red, visible 5 miles, is shown from a similar mast on Marjorie Island, westward of Sandys Point and about 1 mile westward of Beaver Island Lightmast.

Buoys.—A red spar buoy marks the end of the shoal off Maclean Point, about ½ mile southwestward of Doctor Island.

Two red spar buoys mark the northern side of the channel southward of Beaver Island, and a black spar buoy is moored on the southern side of the channel southeastward of Beaver Island.

A red spar buoy marks the northern and a black spar buoy the southern side of the channel northwestward of Sandys Point.

The chart is the best guide for the navigation of St. Peter Inlet, but owing to the narrowness of the channel and its sharp turns, it is desirable to have a pilot.

St. Peter Canal connects Bras d'Or Lake with St. Peter Bay; it is 2,400 feet in length, 55 feet wide at the water level, and has a depth of 19 feet at lowest water. There is one tidal lock 48 feet wide, and 200 feet long from gate to gate, with a depth over the sills of 18 feet at lowest water; it has four pairs of gates. The mean lake level of St. Peter Inlet at the northern end of the canal is rather more than 2 feet below the level of high water ordinary springs in St. Peter Bay; winds may cause a fluctuation of about 2 feet in level in that part of St. Peter Inlet, but tidal influence is imperceptible.

Vessels drawing over 16 feet should not use the canal, as there is little more than that depth between the northern canal entrance and Campbell Island, and the turn there is very short and sharp.

The advantages of this canal to numerous vessels engaged in the trade to and from Sydney mines are very great, as it affords a short and safe route through Bras d'Or. It also benefits the settlers along the shores of Bras d'Or, by opening a route to markets for agricultural produce at Arichat, Canso, and other places where the fisheries are almost exclusively prosecuted.

Barachois and Johnson Harbors and Campbell Cove.—Within 3 miles northeastward from Chapel Island, peninsulas and islands, joined together by shingle beaches, form the intricate Barachois and Johnson harbors, within Evans and Wilson Islands. For these, together with Campbell Cove and other coves and ponds, capable of affording shelter to small vessels and boats, and also for the shoals in the passage between those places, and Kelly Shoals, and Red Islands, see the chart. There is a wharf in Johnson Harbor 56 feet long, with a depth of 10 feet at its outer end.

Red Islands Light, fixed white, visible 8 miles, is shown, 47 feet above high lake level, from a square white tower with a red lantern, 37 feet high on McKenzie Point, at the western side of Campbell Cove Entrance.

Red Islands, 3½ miles, 7° from Evans Point, and four in number, two of which are very small, have cliffs of red sandstone and clay, and form a secure boat harbor, open to the southward toward the mainland, in which direction they are prolonged under water, so as to leave a navigable passage only ¼ mile wide. The outer or northwestern point of these islands is distant 1½ miles from the shore at Campbell Cove, and there is a small rocky 4-fathom patch 1 mile 40° from it. Within the distance of ½ mile from this patch the depth amounts to 30 fathoms, and 1 mile to the eastward to 40 fathoms. At Red Island Settlement, on the mainland opposite to the islands, there is a chapel, and the land rises in the rear to the height of 450 feet.

A black spar buoy marks the southeastern end of the western spit extending southward from Red Islands.

East Bay.—The entrance of East Bay lies between Cape Rhumore, situated 5 miles northeastward from Red Island Settlement and Benacadie Point, which bears 306°, distant 4 miles from the cape, and the bay extends in a northeasterly direction for about 16 miles. It is clear of shoals for 4 miles within its entrance.

The soundings in East Bay are very irregular; the greatest depth of 42 fathoms occurs above Macdougall Point, where the breadth of the bay is 1¼ miles.

Anchorage.—The long fetch, the great depth of water, or the nature of the bottom, render anchorage everywhere unsafe, except in the small places named herein.

Amaguadees Pond lies on the northern side of East Bay about 3 miles eastward of Benacadie Point; it is a large sheet of water, about 1 mile long and ¼ mile wide, with a depth of 2 to 4 fathoms, separated from the bay by a beach of gravel over clay and about 4 feet high. There is an outlet at its eastern end, but it is only open for short periods after freshets, when it is available for small boats. There is a wharf on the outer side of the beach, and near its eastern end, 128 feet long, with a depth of 11 feet alongside it at low lake level.

Lochmore Harbor, on the southern shore, 3½ miles within Cape Rhumore, is formed by a long shingle beach, with its entrance from the eastward, and 8 feet water on its bar. It is suitable for small craft. There is a chapel here, and the country is well settled between the sea and the hills, which rise to the height of 500 feet at ½ mile inland.

Christmas Pond.—Christmas Island lies ¼ mile off the northern shore of East Bay 3 miles 333° from Lochmore, and ½ mile westward of the island is the sand and shingle beach of Christmas Pond, forming a boat harbor, which is rendered difficult of access by shoals off either end of the island. On the mainland, northeastward of the island, and on the banks of a considerable stream, are the Indian chapel and settlement of Eskiscogumic.

Big Island, 2 miles eastward of Christmas Island, is composed of three parts connected together by shingle beaches. The eastern part of the island is joined to the mainland by a beach of sand and shingle 1 mile in length in a westerly direction; and southwestward of this beach and on the northern side of the island is West Eskasoni, a small but secure harbor for small vessels. The reefs off the southern side of this island, and also off its eastern and western points, are covered by 2 to 3 feet of water, and extend ½ mile from the shore.

Similar shoals continue for 2 miles northeastward and reach half way across toward the southern shore of the bay, which is here 1¼ miles wide. Intricate channels between these shoals lead into a harbor situated northward of Big Island and its long shingle beach, containing five islands, the largest of which is called Macphie Island, and extending westward to the Indian settlement, a distance of 2¼ miles. The depth of water in this harbor is sufficient for vessels of moderate draft, but the best entrance even between the reef off Big Island and the shoals eastward of it is difficult.

Two red spar buoys mark the shoal extending from the western end of Big Island; a black spar buoy marks the east end of the shoal extending from the eastern end of Big Island, and a red spar buoy marks the north side of the entrance channel there. There are also two red spar buoys in the inner channels west and north of Macphie Island.

Marble Point lies about 1¼ miles southeastward of the eastern end of Big Island, on the southern shore of East Bay, and ½ mile northeastward of the point a shingle beach incloses a large pond, and a long reef runs out northeastward from it at the distance of ¼ mile from the shore. Marble Hill, nearly 1 mile eastward of the point, rises 540 feet above the sea.

Macdougall Point.—On the eastern side of Macdougall Point, 1½ miles farther northeastward, there is a pond, similar to that northeastward of Marble Point. Shoal water runs out 400 yards from this point toward the shoals lying off the opposite shore, the channel between them being 1,300 yards wide.

Cosset Point is on the northern shore of East Bay, 3 miles northeastward of Big Island; there is a small harbor within the point, open to the eastward and formed by a sand and shingle beach, from which a reef runs out 800 yards to the southeastward.

A wharf exists in the cove between Cosset Point and McAdam Point. A bank with a depth of 6 feet over it extends northeast and southwest about 600 yards across the mouth of this cove.

A red spar buoy is moored at the southwestern end of the 6-foot bank, and a black spar buoy at its northeastern end.

McAdam Point is 1 mile eastward of Cosset Point, and a reef runs 350 yards off it; a reef runs out the same distance from a point a little farther up the bay on the southern shore. The remaining distance of 3½ miles to the head of East Bay is almost clear of shoals, the shallow water nowhere reaching beyond 150 yards from the shore, with the exception of McVarish Shoal, about 1 mile from the head of the bay along the north shore, opposite Campbell Point on the south shore.

McVarish Shoal is marked by three black spar buoys, one at each end and one midway along its edge, and a red spar buoy marks the edge of shoal water off Campbell Point.

Head of East Bay.—At the head of East Bay, shingle beaches inclose a large pond, which boats can enter and ascend to the bridge, a distance of ¾ mile. The pond continues 1 mile farther, shallow and full of mud and weeds; and from its head the distance is 2 miles to Forks Lake and 4 miles to South Arm of Sydney Harbor, into which Forks Lake discharges its waters.

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